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ConocoPhillips Alaska

ConocoPhillips Alaska Inc.
NSPS OOOOa Leak Detection and Repair Emissions Monitoring Plan

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Program Overview

The following is a brief summary of ConocoPhillips Alaska Inc. (CPAI) leak detection and repair (LDAR) program for its North Slope operations. Additional detail can be found in the following LDAR Emission Monitoring Plan (EMP).

UID	Requirement Type	Requirement	EMP Section
1	Applicability	KRU and ALP "affected" drill sites. See Appendix A for a list of sites	2.0
2	Affected Equipment	All components (i.e. valves, connectors, pressure relief devices, open-ended lines, flanges, etc.) in hydrocarbon service that are not designed to vent during normal operations. Survey areas at each drill site include: line heaters, chemical injection/skid, production modules, tanks, wells, test separators, meter skids and pig modules.	2.1
3	Leak Detection Survey	Initial – Within 6 months of "startup of production" or 30 June Routine – Annually with at least nine (9) months separation between consecutive surveys	3.1
4	Repair	Within 30 calendar days of finding each leaking component unless component qualifies for Delay of Repair (DOR)	4.1 and 4.3
5	Re-survey	Within 30 days of repair/replacement of each leaking component	4.2
6	Recordkeeping	Inspection – Survey forms, digital photographs, number and type of components found leaking, deviations from the EMP Repair – Tagged leaking components, repair methods for each leak, number of components placed on delay of repair and explanation for placement, date of successful repair Retention of all versions of the EMP	6.0
7	Reporting	Annual report submittal to USEPA	N/A
8	Change Management	New drill site development and frac/refrac existing wells and addition of wells at "existing" drill sites	2.3

1.0 Introduction and Objective

The United States Environmental Protection Agency (USEPA) federal air regulation 40 CFR Part 60 Subpart OOOOa – Standards of Performance for Crude Oil and Natural Gas Facilities (NSPS OOOOa or Rule) establishes leak detection and repair (LDAR) requirements for onshore production activities.

The USEPA's LDAR requirements are designed to minimize fugitive emissions from equipment (aka components) such as valves, connectors, pressure relief valves, and flanges. This is accomplished through the implementation of periodic leak detection monitoring and executing repairs to eliminate any "leaking" components identified.

Operators subject to the NSPS OOOOa LDAR requirements are required to prepare an Emissions Monitoring Plan (EMP) describing the processes and procedures used to conduct leak detection monitoring and execute repairs [§60.5397a(b)].

The following document is used to satisfy the EMP requirements in NSPS OOOOa for the ConocoPhillips Alaska Inc. (CPAI) North Slope production activities located in Alaska.

2.0 Applicability and Affected CPAI Operations

The NSPS OOOOa LDAR requirements apply to "affected facilities" which commence "construction", "modification", or "reconstruction" after 9/18/15 [§60.5365a].

2.1 Regulatory Affected Facility Definition

NSPS OOOOa LDAR applicability is based on the following definitions:

> **Affected Facility**: The collection of fugitive emission components at a well site [§60.5365a(i)]
>
> **NOTE:** A well site that only contains one or more wellheads is not an affected facility [§60.5365a(i)(2)].
>
> ***Fugitive emissions component*** *means any component that has the potential to emit fugitive emissions of methane or VOC at a well site or compressor station, including but not limited to valves, connectors, pressure relief devices, open-ended lines, flanges, covers, and closed vent systems not subject to §60.5411a, thief hatches or other openings on a controlled storage vessel not subject to §60.5395a, compressors, instruments, and meters. Devices that vent as part of normal operations, such as natural gas-driven pneumatic controllers or natural gas-driven pneumatic pumps are not fugitive emission components, insofar as the natural gas discharged from the device's vent is not considered a fugitive emission. Emissions originating from other than the vent, such as the thief hatch on a controlled storage vessel, would be considered fugitive emissions [§60.5430a].*
>
> ***Well site*** *means one or more surface sites that are constructed for the drilling and subsequent operation of any oil well, natural gas well, or injection well. For the purposes of the fugitive*

emissions standards at§ 60.5397a, well site also means a separate tank battery surface site collecting crude oil, condensate, intermediate hydrocarbon liquids, or produced water from wells not located at the well site (e.g. centralized tank batteries) [§60.5430a].

***Surface site** means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed [§60.5430a].*

2.2 CPAI Company-Defined Area

The following CPAI North Slope assets meet the Rule's definition of "well site" and are subject to the NSPS OOOOa LDAR requirements:

A. Kuparuk River Unit (KRU) drill sites (DS)
B. Colville River Unit[1] Oilfield (ALP) drill sites

CPAI has defined the "company-defined area" as the collection of applicable KRU and ALP drill sites across the entire CPAI-operated North Slope area [§60.5397a(b)].

As of the current date of the EMP, no central production facilities (CPFs) are subject to the NSPS OOOOa LDAR requirements. Additionally, the Kuparuk Seawater Treatment Plant (STP) is also excluded from the NSPS OOOOa LDAR requirements.

2.3 Applicability On-Ramps for LDAR Program

As mentioned above, NSPS OOOOa only applies to CPAI well sites that commenced "construction", "modification", or "reconstruction" after 9/18/15.

"Construction" refers to the development of a new "well site" which is equivalent to a new "drill site" in CPAI terminology.

NSPS OOOOa indicates the following activities constitute a "modification" and thereby trigger LDAR requirements if the "modification" occurs after 9/18/15 [§60.5365a(i)(3)]:

A. A new well is drilled at an existing well site;
B. A well at an existing well site is hydraulically fractured; or
C. A well at an existing well site is hydraulically refractured

An "existing well site" refers to any well site where "construction" or "modification" occurred before 9/18/15.

As of the current date of the EMP, **Appendix A** lists the KRU and ALP drill sites subject to the NSPS OOOOa LDAR requirements.

[1] Colville River Unit can also be referred to as Alpine (ALP)

3.0 Fugitive Monitoring Surveys

NSPS OOOOa requires periodic fugitive monitoring surveys to identify fugitive component leaks.

3.1 Survey Frequencies

EMP Required Element: §60.5397a(c)(1)
Frequency for conducting surveys. Surveys must be conducted at least as frequently as required by paragraphs (f) and (g) of this section.

There are two monitoring survey frequencies: initial monitoring and routine monitoring

Initial monitoring surveys are required by 6/3/17 or as described in Table 1, whichever occurs later.

Table 1. Initial Monitoring Survey [§60.5397a(f)(1)] effective 12 March 2018

Event	Due Date
Between September and March	
New drill site construction	within 6 months of "startup of production" or 30 June
"Modified" existing drill site	within 6 months of first day of production (FDOP) or 30 June
Between March and September	
New drill site construction	within 60 calendar days of "startup of production"
"Modified" existing drill site	within 60 calendar days of first day of production (FDOP)

> *"startup of production" means the beginning of initial flow following the end of flowback when there is continuous recovery of salable qualify gas and separation of recovery of any crude oil, condensate, or produced water [§60.5430a].*

Following completion of the "initial monitoring survey", applicable drill sites will be subject to annual routine leak detection surveys [§60.5397a(g)(1) effective 12 March 2018].

Table 2. Ongoing Routine Monitoring Frequency [§60.5397a(g)(1)] effective 12 March 2018

Ongoing Routine Monitoring Frequency	Comments
Annual *	Consecutive annual monitoring surveys must be conducted at least 9 months apart

***Note:** fugitive components that qualify as Difficult-to-Monitor (DTM) or Unsafe-to-Monitor (UTM) are subject to different initial and routine monitoring survey frequencies. See Section 5.0 for additional information on DTM and UTM components.

3.2 Survey Techniques

EMP Regulatory Element: §60.5397a(c)(2)
Technique for determining fugitive emissions (i.e., Method 21 at 40 CFR part 60, appendix A-7, or optical gas imaging).

CPAI will use Optical Gas Imaging (OGI) as the primary leak detection survey technique. Additional techniques (e.g. EPA Method 21, soap solution) may be used for re-surveys as described in Section 4.2 of the EMP.

3.3 Leak Definitions

Fugitive components that are identified as "leaking" during initial or routine monitoring surveys are subject to repair requirements in NSPS OOOOa.

Leak definitions are referred to as "fugitive emissions" in NSPS OOOOa and are function of the survey technique used:

Table 3. Fugitive Emissions (aka Leak) Definitions

Survey Technique	Leak Definition
OGI	Any visible emission from a fugitive emission component observed using optical gas imaging
Method 21 Flame Ionization Detector (FID)	Instrument reading of 500 ppmv or greater
Method 21 Photoionization Detector (PID)	Instrument reading of 22.2 ppmv or greater (KRU gas)* Instrument reading of 40.0 ppmv or greater (ALP gas)* Instrument reading of 7.5 ppmv or greater (PBU gas)*

*See Section 4.2 of the EMP for information on the derivation of the PID leak threshold.

3.4 Procedures for Identifying Leaks

EMP Regulatory Element: §60.5397a(c)(4)
Procedures and timeframes for identifying and repairing fugitive emissions components from which fugitive emissions are detected, including timeframes for fugitive emission components that are unsafe to repair. Your repair schedule must meet the requirements of paragraph (h) of this section at a minimum.

Procedures

As described in Section 3.2, CPAI has elected to use OGI as the primary method for conducting the initial and routine leak detection surveys. CPAI has created the following standard operating procedure (SOP) outlining the methodology for conducting leak detection surveys:

- ENVR-NSPS-FIELD-0105 Fugitive Emission Survey ("Fugitive Emission Survey SOP")

The Fugitive Emission Survey SOP addresses items such as:

A. Pre-survey instructions (e.g. hot work permits, etc.)
B. OGI instrument daily checks
C. Conducting OGI surveys
D. Recordkeeping requirements for OGI surveys

Timeframes

See Section 3.1 for information on the timeframes for conducting initial and routine leak detection surveys.

Repairs

See Section 4.0 of the EMP for information on procedures and timeframes for conducting repairs.

3.5 OGI-Specific Survey Requirements

EMP Regulatory Element: §60.5397a(c)(7)(iii) through (vii)
If you are using optical gas imaging, your plan must also include the elements specified in paragraphs (c)(7)(i) through (vii) of this section... *(iii) Procedure for determining the operator's maximum viewing distance from the equipment and how the operator will ensure that this distance is maintained.* *(iv) Procedure for determining maximum wind speed during which monitoring can be performed and how the operator will ensure monitoring occurs only at wind speeds below this threshold.* *(v) Procedures for conducting surveys, including the items specified in paragraphs (c)(7)(v)(A) through (C) of this section.* *(A) How the operator will ensure an adequate thermal background is present in order to view potential fugitive emissions.* *(B) How the operator will deal with adverse monitoring conditions, such as wind.* *(C) How the operator will deal with interferences (e.g., steam).* *(vi) Training and experience needed prior to performing surveys.* *(vii) Procedures for calibration and maintenance. At a minimum, procedures must comply with those recommended by the manufacturer.*

Maximum Viewing Distance [§60.5397a(c)(7)(iii)]

The Maximum Viewing Distance (MVD) is the largest distance between the OGI camera and the fugitive emission component (e.g. valve) that can be viewed within the tolerance of the camera's leak detection sensitivity.

If a component is viewed beyond the MVD, it may not detect a leak. Accordingly, to ensure an accurate leak detection survey is conducted, all fugitive emission components must be viewed within the MVD.

CPAI has established the following MVD for its OGI cameras:

Table 4. OGI Camera Maximum Viewing Distance

Camera Model	Maximum Viewing Distance
FLIR GF320	40 feet
FLIR GF300	40 feet
FLIR ThermaCAM GasFindIR	40 feet

The maximum viewing distance was determined based on field tests CPAI conducted with its OGI equipment. During the field test, a test rig was created with a known gas emission rate and gas quality where the OGI monitoring technician moved away from the emission source until the leak was no longer observable from the camera. The MVD was based on the maximum distance observed.

The MVD is identified in the Fugitive Emission Survey SOP and the OGI monitoring technicians will have field measurement equipment to ensure the MVD is not exceeded during leak inspection surveys.

Maximum Wind Speed [§60.5397a(c)(7)(iv)]

The Maximum Wind Speed (MWS) is the maximum ambient air speed at which camera observations are possible without dispersing the visible emission such that the leak is not visible by the camera.

If a component is viewed beyond the MWS, it may not detect a leak. Accordingly to ensure an accurate leak detection survey is conducted, all fugitive emission components must be viewed within the MWS.

CPAI has established the following MWS for its OGI cameras:

Table 5. OGI Camera Maximum Wind Speed

Camera Model	Maximum Wind Speed
FLIR GF320	15 miles per hour
FLIR GF300	15 miles per hour
FLIR ThermaCAM GasFindIR	15 miles per hour

CPAI will use a MWS based on guidance from the Colorado Department of Health and Environment (CPDPHE) Air Pollution Control Division.

The MWS is identified in the Fugitive Emission Survey SOP and the OGI monitoring technicians will receive training to ensure the MWS is not exceeded during leak inspection surveys. Additionally, OGI monitoring technicians will have anemometers to verify the MWS is not exceeded prior to conducting surveys.

Procedure for Conducting Surveys [§60.5397a(c)(v)]

The procedures for conducting the survey are included in the Fugitive Emission Survey SOP.

Each OGI fugitive emissions survey will assess any component that has the potential to emit fugitive emissions. Devices that vent as apart of normal operation are not considered sources of fugitive emissions and not subject to leak surveys. Some examples of each are:

Fugitive Emissions	Normal Operation (non-Emissions)
• Valves, • Connectors, • Pressure relief devices, • Open-ended lines, • Flanges, • covers and closed vent systems not subject to NSPS OOOO/a	• Natural gas-driven pneumatic controllers • Natural gas-driven pumps • Storage tank vents (not subject to tank emission controls) • Process equipment vents • Combustion equipment vents

Portable, temporary equipment not owned and operated by CPAI, such as contractor flowback equipment, will not be included in leak surveys.

Thermal Background

OGI cameras rely on the difference in thermal signature of the fugitive "cloud" and the thermal signature of the equipment/landscape behind it. The difference between the subject and background's ability to reflect and absorb IR light (thermal signature) is the key to identifying fugitives with OGI. The position of the observer relative to the fugitive emission source and the IR background greatly impacts the potential ability to observe the emission.

The Fugitive Emission Survey SOP describes how an OGI camera operator will manage their observation path and camera position to ensure that adequate thermal background is maintained.

Adverse Monitoring Conditions

The Alaska North Slope is subject to harsh environmental conditions that may impose several, unique adverse monitoring conditions.

Adverse monitoring conditions are addressed in CPAI's Fugitive Emission Survey SOP. Examples of adverse monitoring conditions include, but are not limited to:

- Free-standing water
- Snowpack
- Non-grounded ice
- Tundra wildlife and vegetation restrictions
- Active drilling and completion activities
- Active well work activities
- High winds
- Extreme wind chill and foul weather
- Phase conditions
- Overcast/hazy skies

Whenever possible, CPAI will document adverse monitoring conditions on field log sheets and reschedule leak surveys until the adverse condition is no longer present. Additionally, some adverse monitoring conditions may be addressed under the Unsafe-to-Monitor (UTM).

Interferences

Interferences refer to field conditions where the fugitive emission leak is obscured due to external conditions such as heat that make it difficult to differentiate between the fugitive plume and other ambient conditions.

Interferences are addressed in CPAI's Fugitive Emission Survey SOP. Examples of interferences include, but are not limited to:

- Steam vents
- Heat trails
- Non-hydrocarbon vents
- Normal venting equipment
- Active drilling and completion activities
- Active well work activities
- Combustion vents

Known interferences will be avoided and are accounted for in the monitoring survey Observation Path. Transient or unknown interferences will be noted in the Survey Inspection Form for case-by-case evaluation.

Training and Experience

Prior to conducting leak detection surveys OGI camera operators will be trained in:

- Camera use and handling
- Proper fugitive detection survey procedures
- Re-survey verification procedures
- Survey recordkeeping and reporting expectations

40 CFR 60 Subpart OOOOa does not outline specific frequency on training. As a best practice, initial Training for OGI EMP overview and its associated SOPs, OGI camera operation, and OGI certification for camera technicians will be given to key impacted positions. Annual refreshers training will be given to surveyors. Every three-year refresher of EMP and associated SOPs with any updates to OGI camera operation or regulations will be given to key impacted managers and re-surveyors. Refresher certification upon changing of OGI camera make and/or model will be given to OGI camera technicians.

CPAI maintains a complete copy of the training record and a syllabus of the material covered. The Alpine and Kuparuk Safety/Training Department keeps records of formal training of individuals. Records kept in the Training Department will be reviewed for identification of training needs. Agreements with contract companies include appropriate statements concerning involvement and willingness by contractors to comply with CPAI policy goals of environmental responsibility and safe working conditions. When working at any facility, contractors receive guidance documents and are required to provide their employees with relevant training.

3.6 Observation Path (OGI Surveys)

EMP Regulatory Element: §60.5397a(d)(2)
A defined observation path that ensures that all fugitive emissions components are within sight of the path. The observation path must account for interferences.

Each monitoring survey shall observe each fugitive emission component, as defined in §60.5430a, for fugitive emissions [§60.5397a(e)].

The Observation Path represents guidelines for OGI monitoring technicians to

A. ensure line-of-sight to fugitive emission components

B. ensure observations are within OGI camera tolerances (i.e. MVD)

C. avoid "interferences"

CPAI's Observation Path is comprised of two elements:

i. Site maps identifying areas of the drill site to be inspected and potential observation vantage points

ii. The Fugitive Emissions Survey SOP contains monitoring instructions describing known interferences, potential transient adverse monitoring conditions, and procedures for addressing ad-hoc interferences or unsafe conditions

Site maps for applicable drill sites are included in **Appendix B**. Known interferences are identified in the site maps.

Note that the path indicated is not a walking path from start to finish rather a guideline that highlights areas where interferences are probable.

The observation path, while not strictly defined does has a maximum distance limitation with respect to the subject equipment. The maximum viewing distance associated with the OGI under Section 3.5 of the EMP.

Observations will focus on each piece of equipment individually. Only once the monitoring of each major piece of equipment has been completed (separator, tank etc.), will an operator move to the next piece, to ensure that pieces are not overlooked.

Sitemaps will be reviewed and updated as needed to reflect interferences observed in subsequent surveys.

Transient interferences and other adverse monitoring conditions which may affect monitoring technician observation path are described in the CPAI Fugitive Emission Monitoring SOP.

3.7 Survey Equipment Inventory, Performance Specifications, Calibration, and Maintenance

EMP Regulatory Element: §60.5397a(c)(3), §60.5397a(c)(7)(i), (ii), and (vii)
(c)(3) Manufacturer and model number of fugitive emissions detection equipment to be used. *(c)(7) If you are using optical gas imaging, your plan must also include the elements specified in paragraphs (c)(7)(i) through (vii) of this section.* *(i) Verification that your optical gas imaging equipment meets the specifications of paragraphs (c)(7)(i)(A) and (B) of this section. This verification is an initial verification and may either be performed by the facility, by the manufacturer, or by a third party. For the purposes of complying with the fugitives emissions monitoring program with optical gas imaging, a fugitive emission is defined as any visible emissions observed using optical gas imaging.* *(A) Your optical gas imaging equipment must be capable of imaging gases in the spectral range for the compound of highest concentration in the potential fugitive emissions.* *(B) Your optical gas imaging equipment must be capable of imaging a gas that is half methane, half propane at a concentration of 10,000 ppm at a flow rate of ≤60g/hr from a quarter inch diameter orifice.* *(ii) Procedure for a daily verification check.* ... *(vii) Procedures for calibration and maintenance. At a minimum, procedures must comply with those recommended by the manufacturer.*

OGI Equipment Inventory

Table 6 lists the current OGI cameras used as part of CPAI's LDAR program.

Table 6. CPAI OGI Camera Inventory

Camera Model	Equipment Count
FLIR GF320	2
FLIR GF300	2
FLIR ThermaCAM GasFindIR	1

Performance Specification Initial Verification [§60.5397a(c)(7)(i)]

As allowed per §60.5397a(c)(7)(i), CPAI uses manufacturer verification information to satisfy the OGI camera performance verification. **Appendix C** provides manufacturer documentation for the initial verification for meeting the 60 g/hr performance specification.

Appendix D contains CPAI gas analyses for the KRU and ALP operations. The compound of highest concentration is methane. Appendix C from the OGI camera manufacturer demonstrates that the camera can cover the gas spectral found in CPAI's KRU and ALP operations.

Daily Verification Check [§60.5397a(c)(7)(ii)

Each day that the OGI camera is utilized for fugitive emissions monitoring, a verification of the camera's ability to produce a visible image of the emission will be performed. The Fugitive Emissions Survey SOP outlines the practices required to perform this daily check (i.e. bump-test). Included in the Fugitive Emissions Survey SOP is an example of the daily verification form used to document these tests.

CPAI manages records of the daily verifications in an electronic format that is maintained by the Field Environmental Coordinator.

Calibration and Maintenance [§60.5397a(c)(7)(vii)]

The OGI camera manufacturer indicates that the camera models used for CPAI's LDAR program do not require periodic calibration.

> *Gas Detection: No Calibration Required*
> *The GFx320, GF320, GF300, and G300a camera's ability to detect gases is not influenced by any calibration process and will not degrade over time.*

See **Appendix C** for additional information.

The OGI camera manufacturer recommendation for maintenance for the camera models used for CPAI's LDAR program are included in **Appendix C**.

3.8 Site Maps

EMP Regulatory Element: §60.5397a(d)(1)
Sitemap

Appendix B contains a list of site maps for applicable KRU and ALP drill sites.

3.9 Method 21 Component Lists

EMP Regulatory Element: §60.5397a(d)(3)
If you are using Method 21, your plan must also include a list of fugitive emissions components to be monitored and method for determining location of fugitive emissions components to be monitored in the field (e.g. tagging, identification on a process and instrumentation diagram, etc.)

CPAI is not planning to use EPA's Method 21 FID or PID to conduct any initial or routine monitoring surveys. Therefore, CPAI is not required to maintain list of fugitive components per §60.5397a(d)(3).

4.0 Leak Repairs and Re-Surveys

Any leaking components identified during initial or routine leak surveys **must be repaired or replaced within 30 calendar days** of identification of the leak unless the leaking component qualifies for Delay of Repair (DOR) [§60.5397a(h)(1)].

Each repaired or replaced leaking component **must be re-surveyed as soon as practicable but no later than 30 calendar days after being repaired or replaced** to ensure the component is no longer leaking [§60.5397a(h)(3).

4.1 Procedures for Repairing Leaks

EMP Regulatory Element: §60.5397a(c)(4)
Procedures and timeframes for identifying and repairing fugitive emissions components from which fugitive emissions are detected, including timeframes for fugitive emission components that are unsafe to repair. Your repair schedule must meet the requirements of paragraph (h) of this section at a minimum.

CPAI has created the following standard operating procedure (SOP) outlining the methodology for conducting repairs on equipment found leaking during monitoring surveys:

- ENVR-NSPS-FIELD-0106 Leak Repair ("Fugitive Leak Repair SOP")

The Fugitive Leak Repair SOP addresses items such as:

A. Leak response actions
B. Maintenance work order system instructions for repairs
C. Conducting repair or replacement re-surveys to confirm success
D. Recordkeeping requirements for repairs and re-surveys

Timeframe

All equipment leaks will be repaired within 30 calendar days of identification of the leak unless the component qualifies for DOR. DOR requirements, including unsafe to repair components, are described in Section 4.3 of the EMP.

4.2 Procedures for Verifying Repair Attempts

EMP Regulatory Element: §60.5397a(c)(5)
Procedures and timeframes for verifying fugitive emission component repairs.

CPAI's Fugitive Leak Repair SOP outlines the process for conducting re-surveys following a repair attempt or equipment replacement.

NSPS OOOOa provides three options for conducting re-surveys following repairs or replacement [§60.5397a(h)(3)] :

A. OGI
B. EPA Method 21 Instrument: FID or PID
C. EPA Method 21 Alternate Screening: soap bubbles

CPAI may use any of the three allowable re-surveying options to confirm successful repairs or equipment replacements. See below for additional information on using EPA Method 21 for conducting re-surveys.

EPA Method 21 Instrument: FID or PID

EMP Regulatory Element: §60.5397a(c)(8), §60.5397a(h)(3)(iii)
(8) If you are using Method 21 of appendix A-7 of this part, your plan must also include the elements specified in paragraphs (c)(8)(i) and (ii) of this section. For the purposes of complying with the fugitive emissions monitoring program using Method 21 a fugitive emission is defined as an instrument reading of 500 ppm or greater. *(i) Verification that your monitoring equipment meets the requirements specified in Section 6.0 of Method 21 at 40 CFR part 60, appendix A-7. For purposes of instrument capability, the fugitive emissions definition shall be 500 ppm or greater methane using a FID-based instrument. If you wish to use an analyzer other than a FID-based instrument, you must develop a site-specific fugitive emission definition that would be equivalent to 500 ppm methane using a FID-based instrument (e.g., 10.6 eV PID with a specified isobutylene concentration as the fugitive emission definition would provide equivalent response to your compound of interest).* *(ii) Procedures for conducting surveys. At a minimum, the procedures shall ensure that the surveys comply with the relevant sections of Method 21 at 40 CFR part 60, appendix A-7, including Section 8.3.1.* *(h)(3)(iii) Operators that use Method 21 to re-survey the repaired fugitive emissions components are subject to the re-survey provisions specified in paragraphs (h)(3)(iii)(A) and (B) of this section.* *(A) A fugitive emissions component is repaired when the Method 21 instrument indicates a concentration of less than 500 ppm above background or when no soap bubbles are observed when the alternative screening procedures specified in section 8.3.3 of Method 21 are used.* *(B) Operators must use the Method 21 monitoring requirements specified in paragraph (c)(8)(ii) of this section or the alternative screening procedures specified in section 8.3.3 of Method 21.*

CPAI may use FID or PID instruments to conduct Method 21-based re-surveys. Currently, CPAI maintains the following PID cameras:

Table 7. Method 21 Instruments

Instrument Model	Equipment Count
MiniRae 3000	TBD

Section 3.3 of the EMP provides information on the leak definitions that will be used to determine if a repair or replacement is successful.

The unit-specific responses to readings of fugitive emissions, based on composition exist between PID and FID measurements. When PID-based monitoring is utilized in lieu of FID-based monitoring, a site-specific fugitive emission definition has been established that is equivalent to the leak definition for FID-based monitoring (e.g. 500 ppmv).

The MiniRae 3000 PID instruments used will be equipped with 11.7 eV bulbs. Based on the PID correction factors and FID response factors for gas constituents provided by the manufacturer, CPAI's equivalent leak definition would be (see **Appendix E** for calculations):

A. 22.2 ppmv for measurements made in the KRU field
B. 40.0 ppmv for measurements made in the ALP field
C. 7.5 ppmv for measurements made on PBU gas fuel lines

CPAI's Fugitive Emission Survey SOP describes the procedures CPAI uses for the following Method 21 requirements:

A. Initial Verification requirements in §60.5397a(c)(8)(i)
B. Calibration and monitoring procedures §60.5397a(c)(8)(ii)

EPA Method 21 Alternative Screening: Soap Solution

Additionally, the alternative screening procedure (soap bubble solution) under §8.3.3 of the EPA Method 21 procedure may be utilized for the verification of repairs. A manufacturer has not been identified here as the procedure indicates that the soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water.

Excerpt from Method 21:

> *8.3.3.1 A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument technique of Section 8.3.1 or 8.3.2.*

8.3.3.2 Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of Section 8.3.1 or 8.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

4.3 Delay of Repair

EMP Regulatory Element: §60.5397a(h)(2) effective 12 March 2018
If the repair or replacement is technically infeasible, would require a vent blowdown, a compressor station shutdown, a well shutdown or well shut-in, or would be unsafe to repair during operation of the unit, the repair or replacement must be completed during the next scheduled compressor station shutdown, well shutdown, well shut-in, after a planned vent blowdown or within 2 years, whichever is earlier.

NSPS OOOOa allows operators to delay repairs (on leaks identified during surveys) beyond the 30-day repair deadline if the repair is "technically infeasible" or "would be unsafe to repair during operation of the unit" [§60.5397a(h)(2)] effective 12 March 2018.

"Technically infeasible" is not defined in NSPS OOOOa, but the USEPA provides examples of what constitutes "technically infeasible" such as to repair the leaking equipment would require an:

A. Unplanned vent blowdown
B. Unplanned well shut-in/shutdown
C. Unplanned compression station shutdown

Leaking equipment put on DOR must be repaired during the earlier of:

i. Next planned shutdown/isolation or
ii. Next emergency/unplanned shutdown/isolation where it is feasible to repair the equipment

The CPAI Fugitive Leak Repair SOP outlines the procedures CPAI will use to determine if a leak qualifies to be placed on DOR due to technical infeasibility or unsafe to repair.

5.0 Difficult-To-Monitor and Unsafe-To-Monitor Components

EMP Regulatory Element: §60.5397a(c)(3), (c)(4), and (d)(4)
(c)(3) Fugitive emissions components that cannot be monitored without elevating the monitoring personnel more than 2 meters above the surface may be designated as difficult-to-monitor. Fugitive emissions components that are designated difficult-to-monitor must meet the specifications of paragraphs (g)(3)(i) through (iv) of this section. *(i) A written plan must be developed for all of the fugitive emissions components designated difficult-to-monitor. This written plan must be incorporated into the fugitive emissions monitoring plan required by paragraphs (b), (c), and (d) of this section.* *(ii) The plan must include the identification and location of each fugitive emissions component designated as difficult-to-monitor.* *(iii) The plan must include an explanation of why each fugitive emissions component designated as difficult-to-monitor is difficult-to-monitor.* *(iv) The plan must include a schedule for monitoring the difficult-to-monitor fugitive emissions components at least once per calendar year.* *(c)(4) Fugitive emissions components that cannot be monitored because monitoring personnel would be exposed to immediate danger while conducting a monitoring survey may be designated as unsafe-to monitor. Fugitive emissions components that are designated unsafe-to-monitor must meet the specifications of paragraphs (g)(4)(i) through (iv) of this section.* *(i) A written plan must be developed for all of the fugitive emissions components designated unsafe-to-monitor. This written plan must be incorporated into the fugitive emissions monitoring plan required by paragraphs (b), (c), and (d) of this section.* *(ii) The plan must include the identification and location of each fugitive emissions component designated as unsafe-to-monitor.* *(iii) The plan must include an explanation of why each fugitive emissions component designated as unsafe-to-monitor is unsafe-to-monitor.* *(iv) The plan must include a schedule for monitoring the fugitive emissions components designated as unsafe-to-monitor.* *(4) Your plan must also include the written plan developed for all of the fugitive emission components designated as difficult-to-monitor in accordance with paragraph (g)(3)(i) of this section, and the written plan for fugitive emission components designated as unsafe-to-monitor in accordance with paragraph (g)(3)(ii) of this section.*

As of the current date of this EMP, CPAI has not elected to categorize any components as DTM. However, CPAI may designate components as DTM in the future where appropriate.

The following are examples of scenarios that could expose monitoring personnel to immediate danger while conducting monitoring surveys and utilize UTM designations:

A. Free-standing water
B. Non-grounded ice
C. Tundra wildlife
D. Active drilling and completion activities
E. Active well work activities

F. Extreme wind chill and foul weather
G. Phase conditions

The CPAI Fugitive Monitoring Survey SOP provides additional descriptions of the hazards and explanation of why these scenarios can expose monitoring personnel to immediate danger during leak detection surveys. These scenarios can be transient (e.g. wildlife, weather) or longer in duration (e.g. multi-well drilling campaign). Safety determinations will be made on a case-by-case evaluation. Where possible, leak detection surveys will be scheduled around transient safety issues.

If it is not possible to conduct an initial or periodic due to safety concerns of exposing monitoring technicians to immediate danger, CPAI will complete an inventory of the components qualifying for UTM and prepare a schedule for conducting the survey at the next safe opportunity.

6.0 Recordkeeping

EMP Regulatory Element: §60.5397a(c)(6)
Records that will be kept and the length of time records will be kept.

The following NSPS OOOOa LDAR records must be maintained for a period of at least 5 years [§60.5420a(c)].

6.1 Inspection Records

UID	Record	Citation
1	Date of each monitoring survey	§60.5420a(c)(15)(ii)(A)
2	Beginning and end time of each monitoring survey	§60.5420a(c)(15)(ii)(B)
3	Name of the operator(s) performing the survey as well as annotation of the training and experience of the operator	§60.5420a(c)(15)(ii)(C)
4	Monitoring instrument used	§60.5420a(c)(15)(ii)(D)
5	When using OGI, one or more digital photograph or video captured from the OGI instrument used for the monitoring survey. Photograph/video must include: a. Date taken b. Latitude and longitude of survey location imbedded within the file **OR**, a photograph/video of a separately operating GPS device within the same digital picture as long as the latitude and longitude output from the GPS can be clearly read	§60.5420a(c)(15)(ii)(E)
6	Fugitive emissions component identification when Method 21 is used	§60.5420a(c)(15)(ii)(F)
7	Ambient temperature, sky conditions, and maximum wind speed at the time of the survey	§60.5420a(c)(15)(ii)(G)
8	Any deviations from the monitoring plan or a statement that there were no deviations from the monitoring plan	§60.5420a(c)(15)(ii)(H)
9	Location of each fugitive emission (i.e. leak) found	§60.5420a(c)(15)(ii)(I)(1)

UID	Record	Citation
10	Number and type of components for which fugitive emissions were detected	§60.5420a(c)(15)(ii)(I)(3)
11	Number and type of DTM and UTM components monitored	§60.5420a(c)(15)(ii)(I)(4)

6.2 Repair Records

UID	Record	Citation
1	Number and type of fugitive emission components not repaired as required in §60.5397(a)(h)	§60.5420a(c)(15)(ii)(I)(6)
2	Number and type of components that were tagged as a result of not being repaired during the monitoring survey	§60.5420a(c)(15)(ii)(I)(7)
3	If a fugitive emissions component is not tagged, a digital photograph or video that clearly identifies the location of the component to be repaired	§60.5420a(c)(15)(ii)(I)(8)
4	Repair methods applied in each attempt to repair the fugitive emissions components	§60.5420a(c)(15)(ii)(I)(9)
5	Number and type of fugitive emissions components placed on delay or repair and explanation for each delay of repair	§60.5420a(c)(15)(ii)(I)(10)
6	The date of successful repair of the fugitive emissions component	§60.5420a(c)(15)(ii)(I)(11)
7	Instrumentation used to re-survey a repaired fugitive emissions component	§60.5420a(c)(15)(ii)(I)(12)

6.3 Other Records

UID	Record	Citation
1	The fugitive emissions monitoring plan as required in §60.5397a(b), (c), and (d).	§60.5420a(c)(15)(i)

See CPA Fugitive Emissions Survey and Fugitive Leak Repair SOPs for recordkeeping templates.

Appendix A List of Affected Facilities

CPAI Drill Sites Current Subject to NSPS OOOOa LDAR Requirements

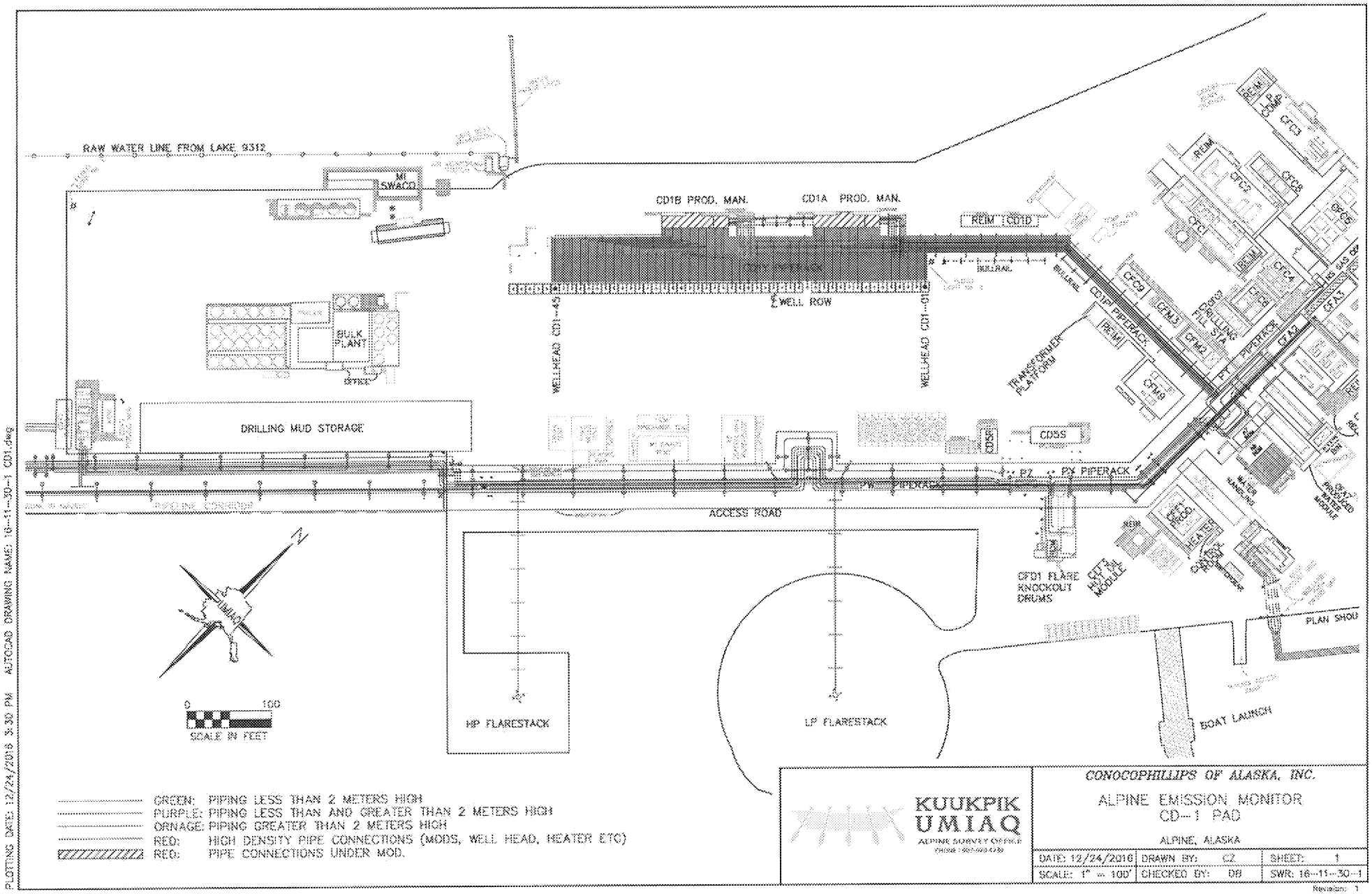
Table A- 1. List of Affected ALP Drill Sites

Facility Name	Date Subject	Date Initial Monitoring
CD2	2/27/2017	5/12/2017
CD3	4/16/2017	5/13/2017
CD4	3/3/2018	6/15/2018
CD5	10/18/2015	5/14/2017
MT6	9/14/2018	

Table A- 2. List of Affected KRU Drill Sites

Facility Name	Date Subject	Date Initial Monitoring
DS-1A	2/6/2018	2/9/2018
DS-1B	11/11/2016	4/30/2017
DS-1C	10/18/2015	5/10/2017
DS-1D	1/16/2018	2/4/2018
DS-1E	4/02/2017	5/9/2017
DS-1G	10/13/2015	5/6/2017
DS-1H	4/4/2016	5/7/2017
DS-1L	6/7/2016	5/8/2017
DS-1Q	10/5/2018	1/27/2019
DS-2A	8/27/2017	9/6/2017
DS-2B	10/28/2016	4/30/2017
DS-2E	11/19/2015	4/30/2017
DS-2G	12/19/2017	1/15/2018
DS-2K	3/23/2016	4/30/2017
DS-2M	3/20/2016	4/29/2017
DS-2S	11/04/2015	4/28/2017
DS-2T	1/10/2016	4/29/2017
DS-2X	12/10/2016	4/29/2017
DS-2Z	4/25/2017	5/1/2017
DS-3A	12/7/2015	5/3/2017
DS-3C	1/26/2019	6/26/2019
DS-3F	9/30/2016	5/5/2017
DS-3G	2/9/2016	5/5/2017
DS-3H	5/14/2016	5/3/2017
DS-3I	10/19/2018	10/20/2018
DS-3K	10/28/2015	5/4/2017
DS-3M	2/1/2017	5/4/2017
DS-3N	2/3/2016	5/2/2017
DS-3O	12/20/2015	5/2/2017
DS-3Q	1/21/2016	5/1/2017
DS-3R	3/22/2017	5/1/2017
DS-3S	5/24/2016	5/6/2017

Appendix B Site Maps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MI SWACO
CD1B PROD. MAN.
CD1A PROD. MAN.
REIM (CD1D)
WELL ROW
WELLHEAD CD1-45
WELLHEAD CD1-01
BULK PLANT
OFFICE
DRILLING MUD STORAGE
CD5P
CD5S
PZ
PX PIPERACK
PW PIPERACK
ACCESS ROAD
TRANSFORMER PLATFORM
CFD1 FLARE KNOCKOUT DRUMS
HP FLARESTACK
LP FLARESTACK
BOAT LAUNCH
PLAN SHOU
N
0
100
SCALE IN FEET
GREEN: PIPING LESS THAN 2 METERS HIGH
PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
ORNAGE: PIPING GREATER THAN 2 METERS HIGH
RED: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
RED: PIPE CONNECTIONS UNDER MOD.
KUUKPIK UMIAQ
ALPINE SURVEY OFFICE
CONOCOPHILLIPS OF ALASKA, INC.
ALPINE EMISSION MONITOR
CD-1 PAD
ALPINE, ALASKA
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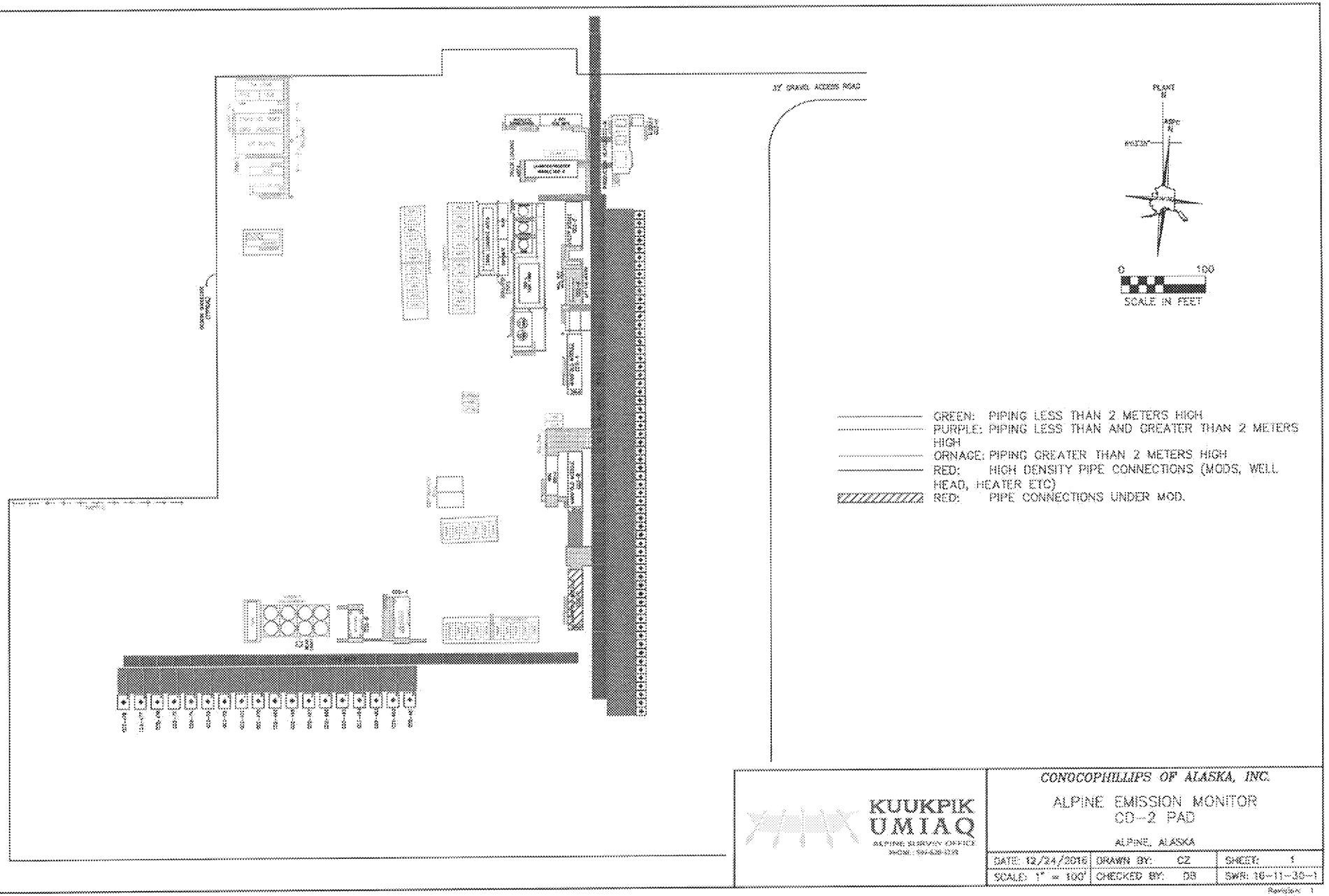

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KUUKPIK UMIAQ
ALPINE SURVEY OFFICE
PHONE: 907-670-7235

CONOCOPHILLIPS OF ALASKA, INC.

ALPINE EMISSION MONITOR
CD-2 PAD

ALPINE, ALASKA

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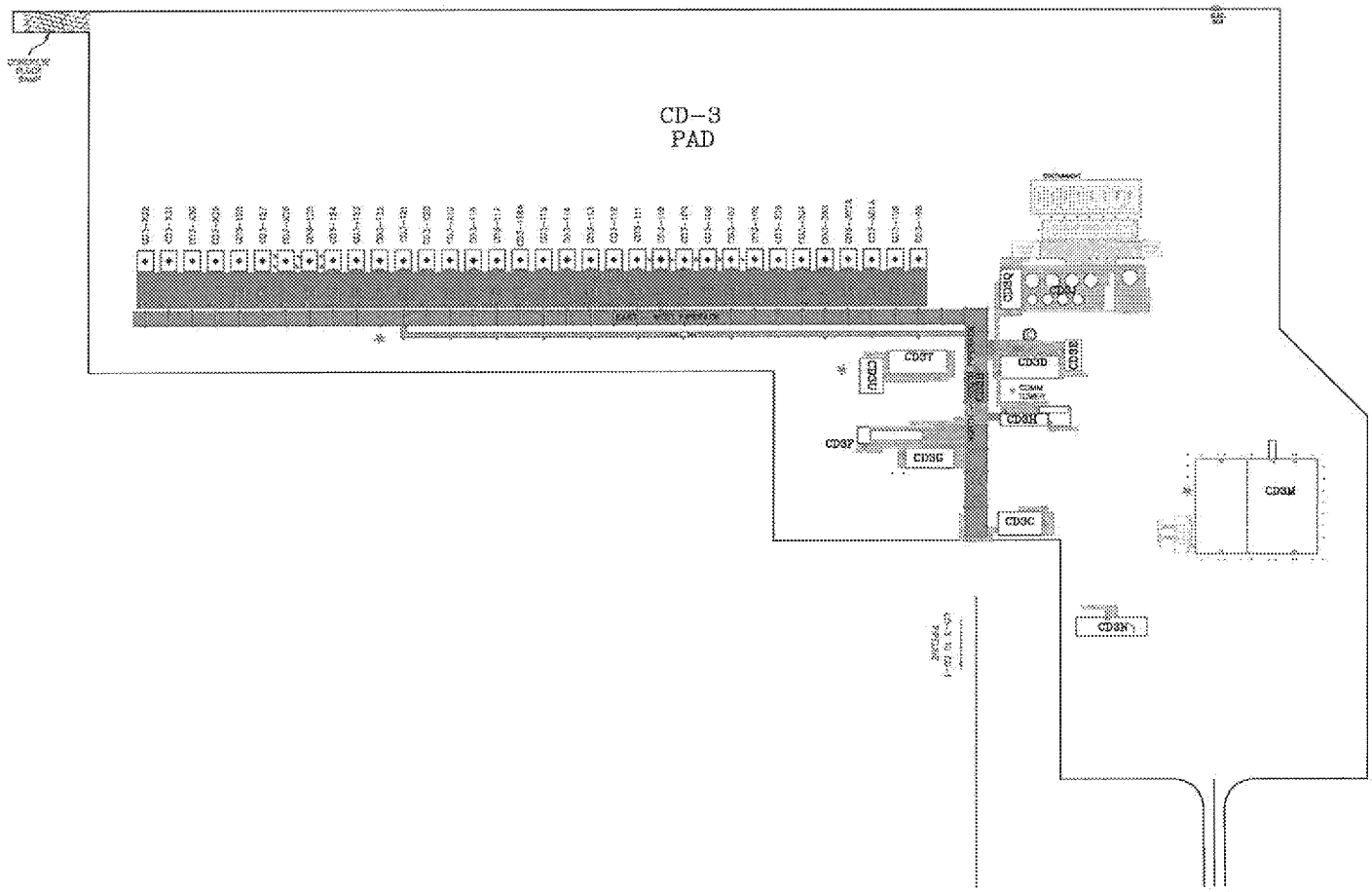

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PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
ORNAGE: PIPING GREATER THAN 2 METERS HIGH
RED: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
RED: PIPE CONNECTIONS UNDER MOD.

KUUKPIK UMIAQ
ALPINE SURVEY OFFICE
PHONE: 907-670-4799

CONOCOPHILLIPS OF ALASKA, INC.

ALPINE EMISSION MONITOR
CD-3 PAD

ALPINE, ALASKA

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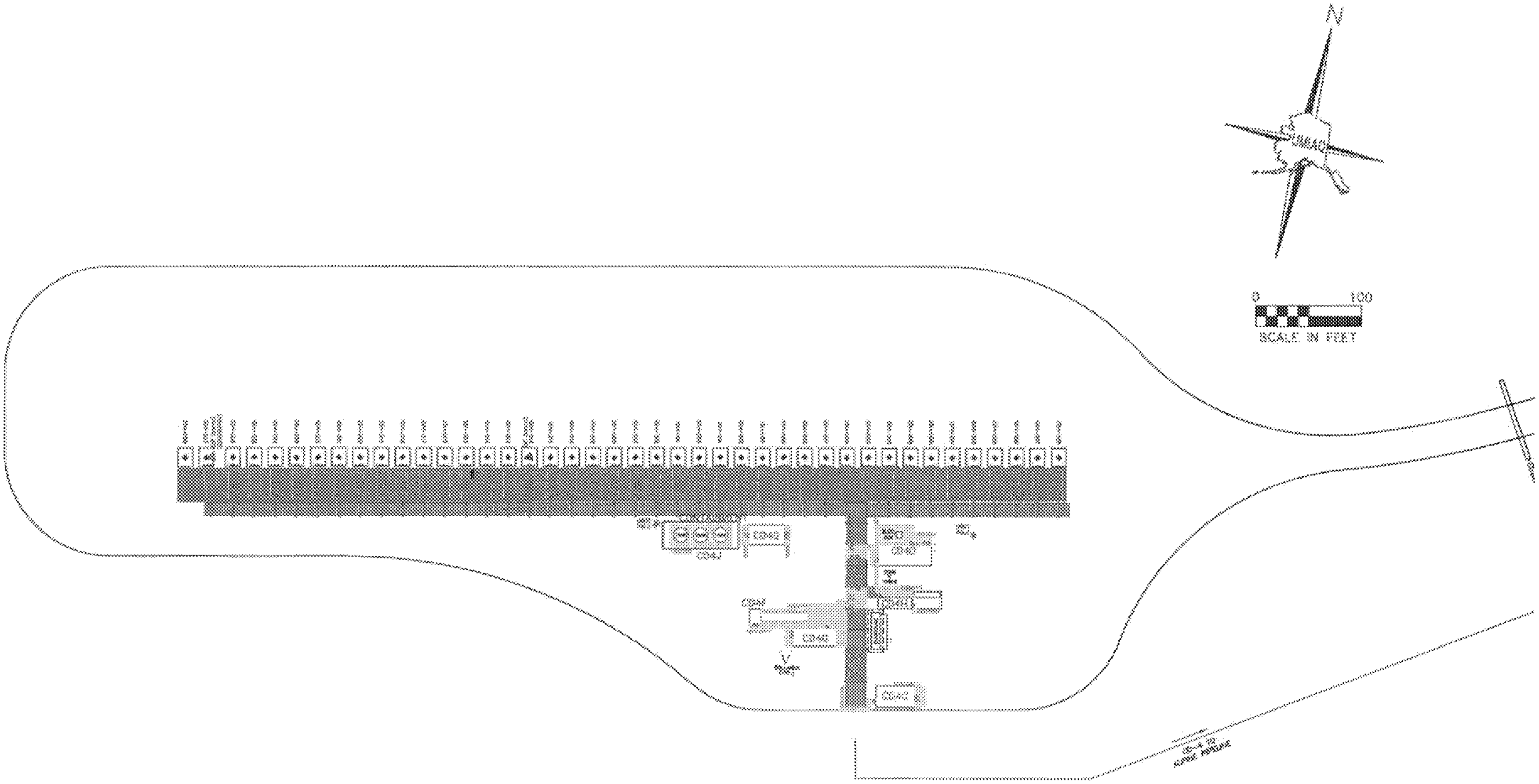

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PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
ORNAGE: PIPING GREATER THAN 2 METERS HIGH
RED: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
RED: PIPE CONNECTIONS UNDER MOD.

KUUKPIK UMIAQ
ALPINE SURVEY OFFICE

CONOCOPHILLIPS OF ALASKA, INC.

ALPINE EMISSION MONITOR
CD-4 PAD

ALPINE, ALASKA

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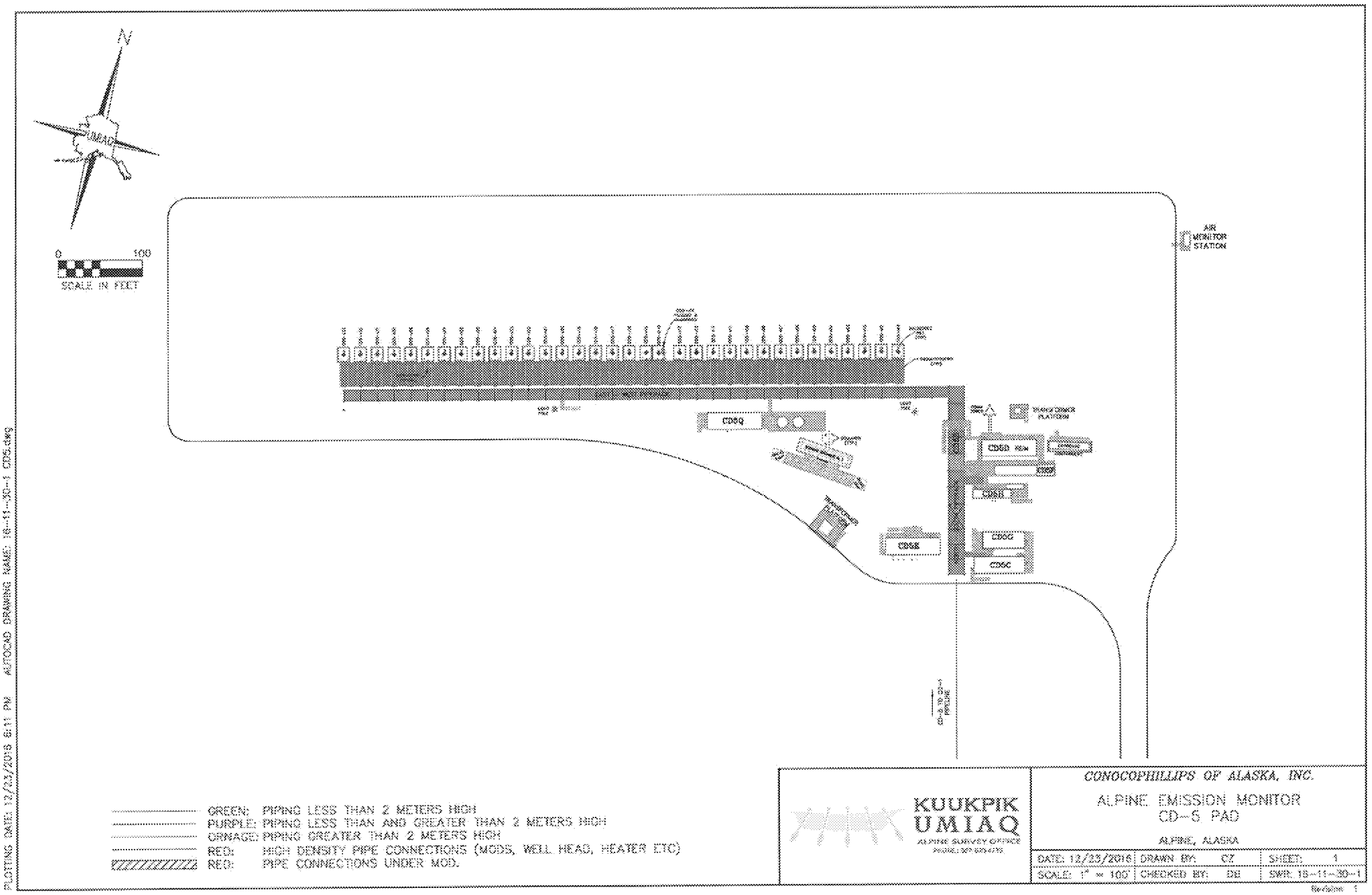

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ORNAGE: PIPING GREATER THAN 2 METERS HIGH
RED: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
RED: PIPE CONNECTIONS UNDER MOD.

KUUKPIK UMIAQ
ALPINE SURVEY OFFICE

CONOCOPHILLIPS OF ALASKA, INC.

ALPINE EMISSION MONITOR
CD-5 PAD

ALPINE, ALASKA

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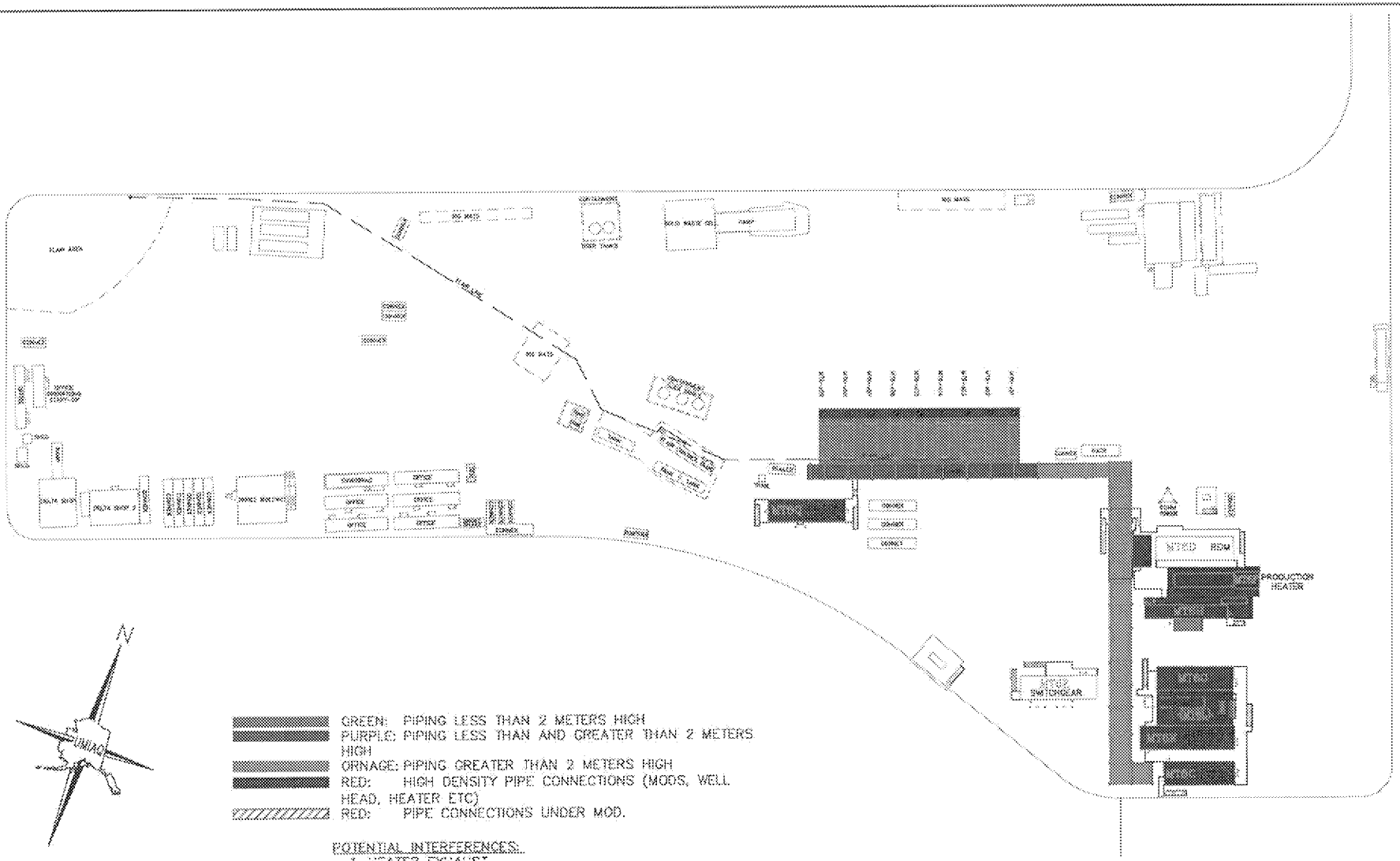

KUUKPIK UMIAQ
ALPINE SURVEY OFFICE

CONOCOPHILLIPS OF ALASKA, INC.

ALPINE EMISSION MONITOR
MT-6 PAD

ALPINE, ALASKA

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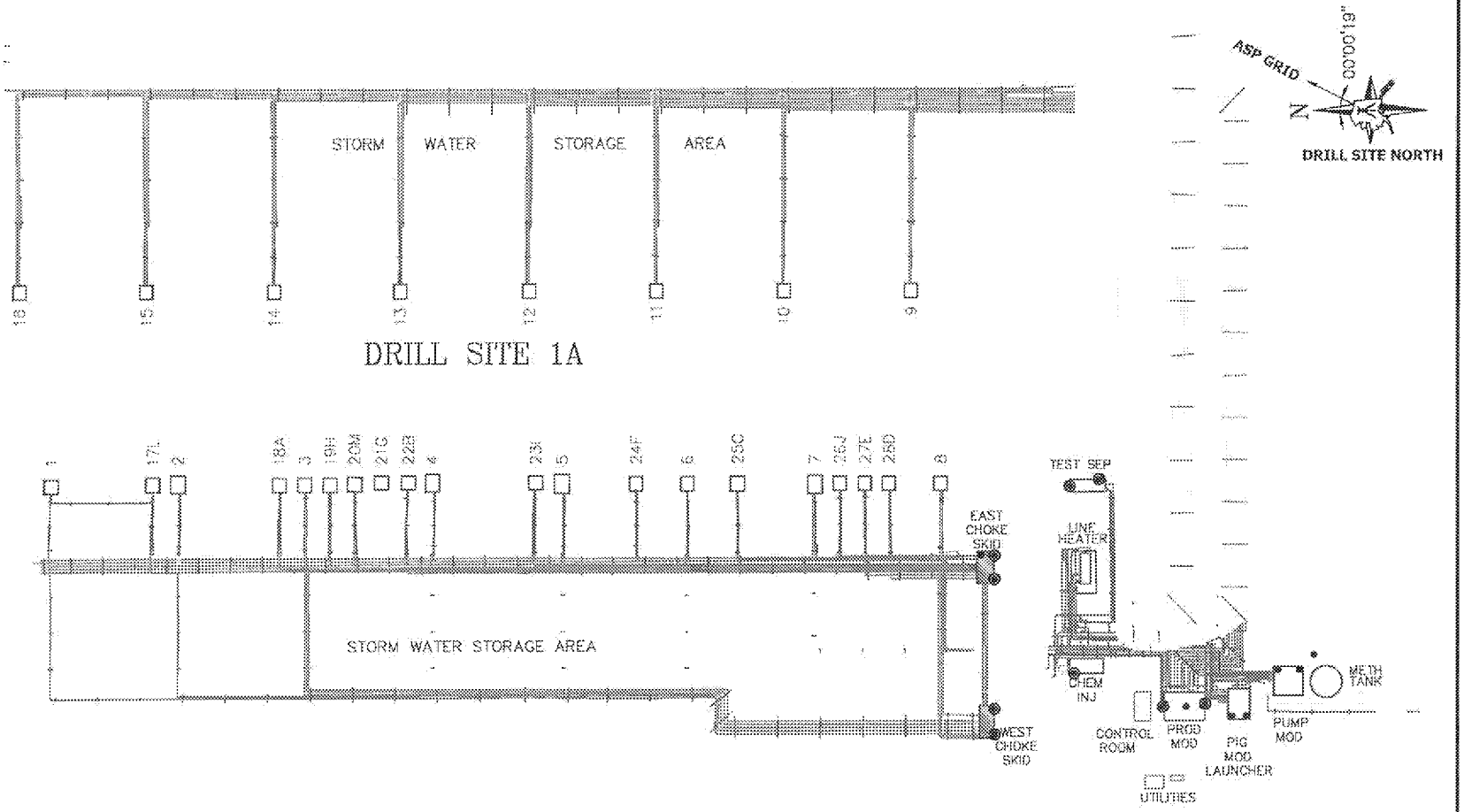

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- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 8SIZE

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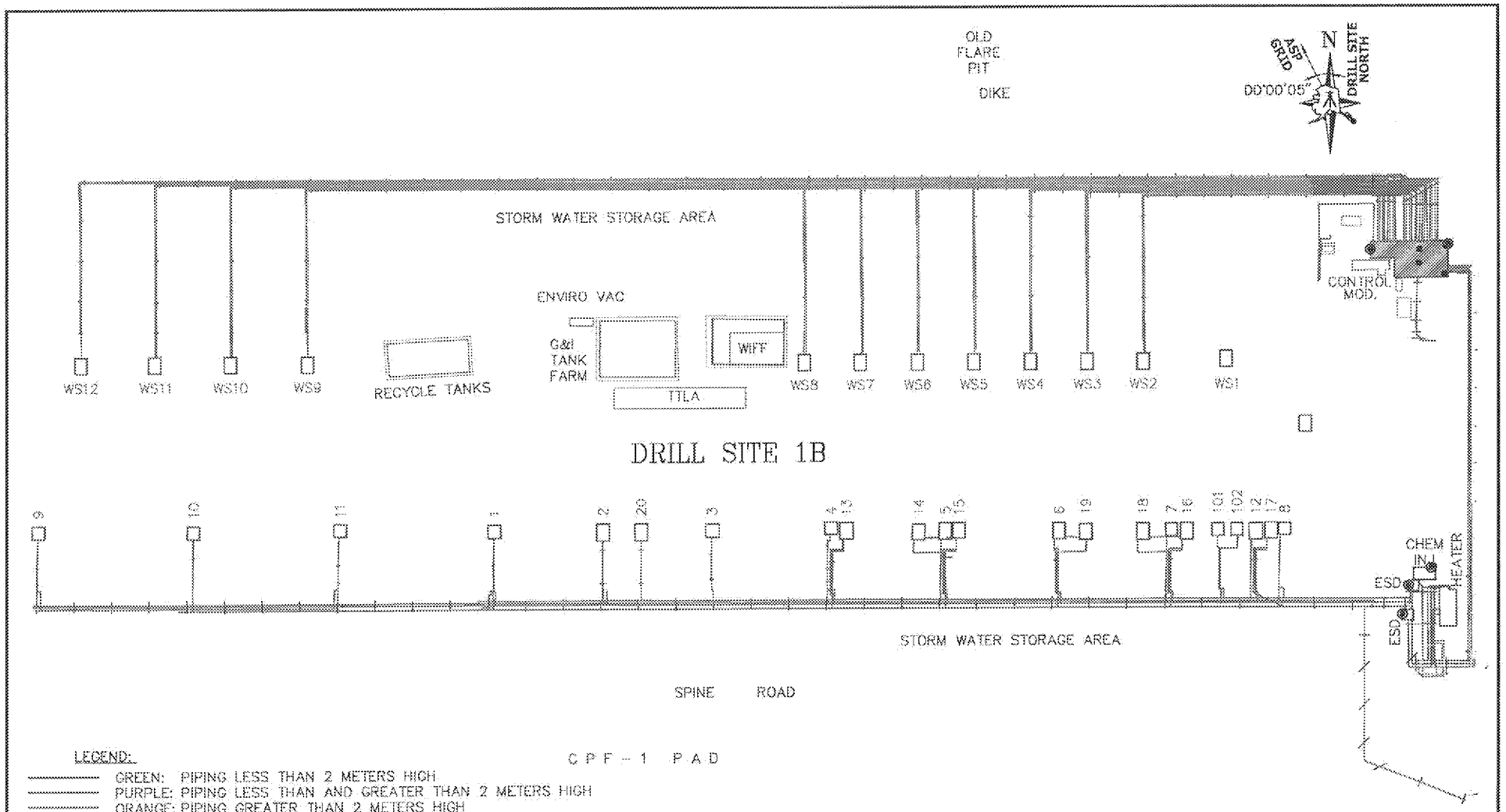

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- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:

1: HEATER EXHAUST
2: TANK VENTS
3: WASTE INJECTION FACILITY PITS

GRAPHIC SCALE

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1 inch = 100 ft.

FORM: BSIZE

LOUNSBURY & ASSOCIATES, INC.

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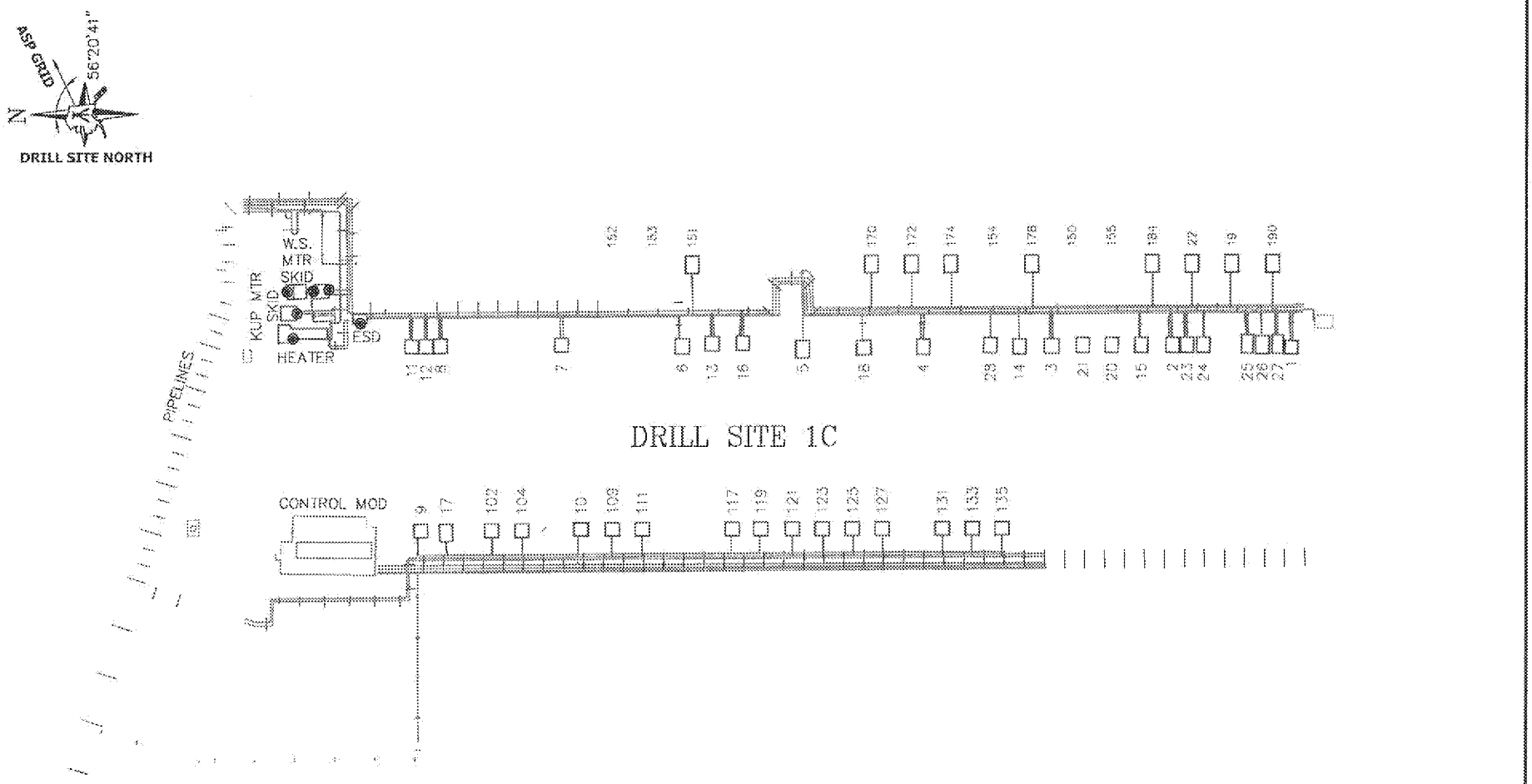

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- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST

GRAPHIC SCALE
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1 inch = 100 ft.

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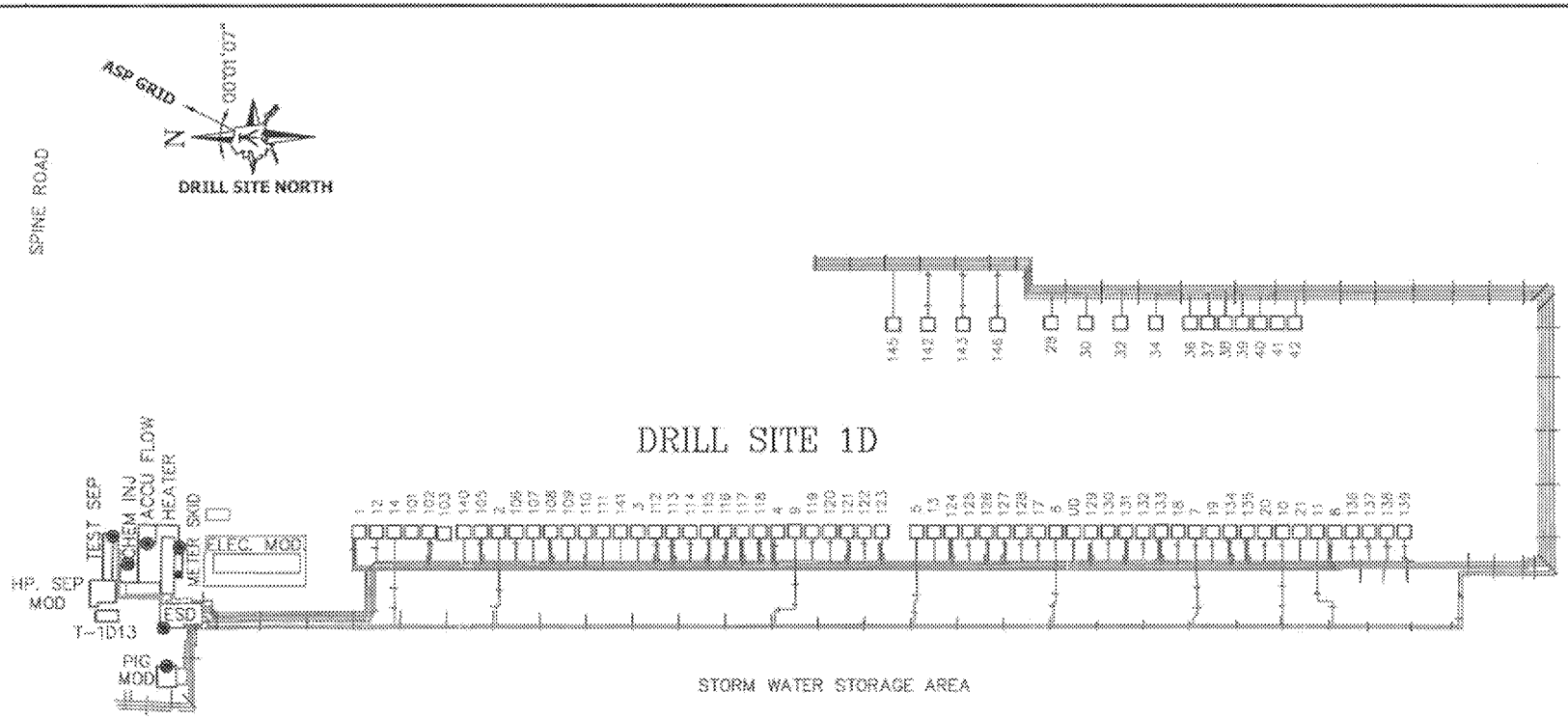

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- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
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1 inch = 100 ft.

FOR AS ISSUED

LOUNSBURY & ASSOCIATES, INC.

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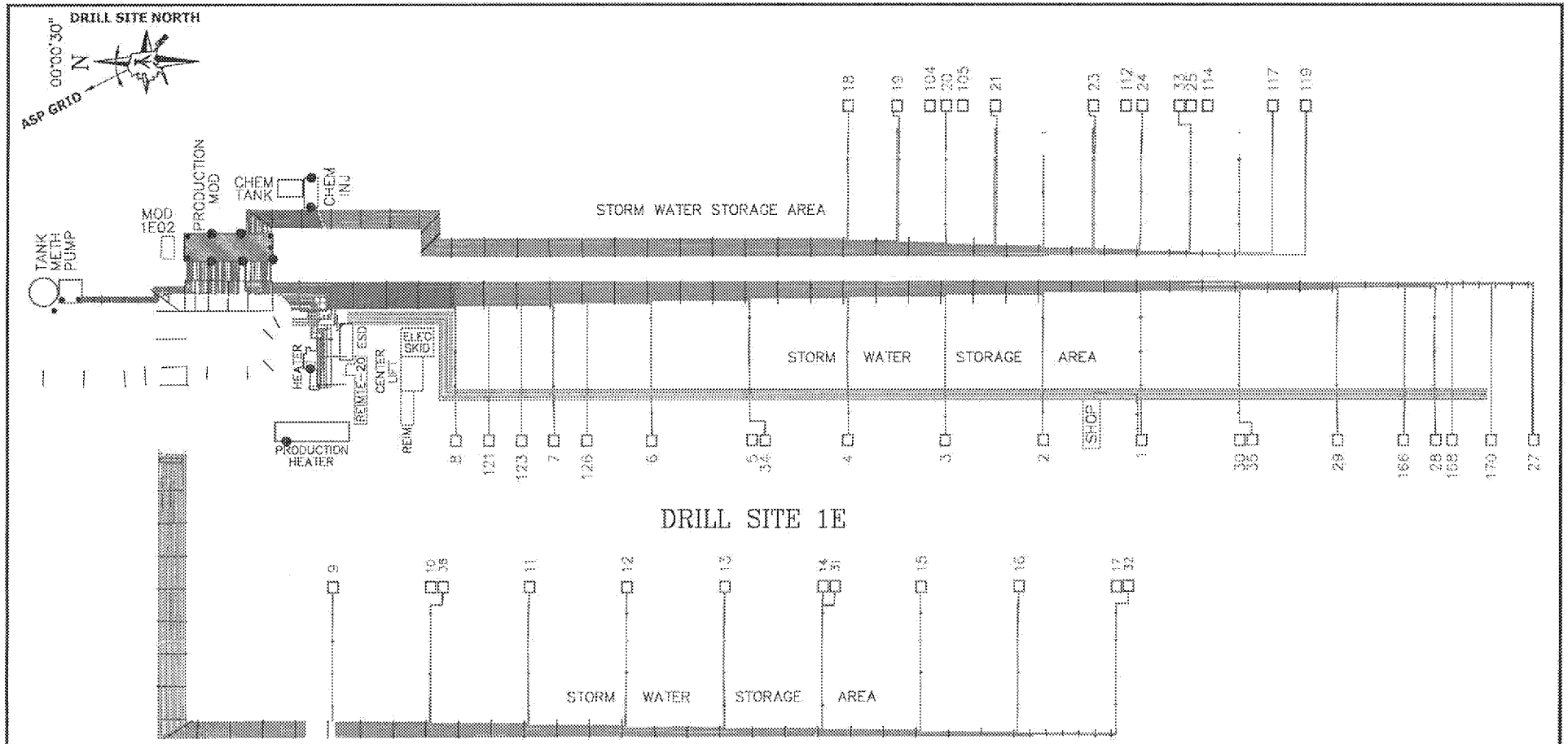

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- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: TANK VENTS

GRAPHIC SCALE
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LOUNSBURY & ASSOCIATES, INC.

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EMISSION MONITORING PLAN

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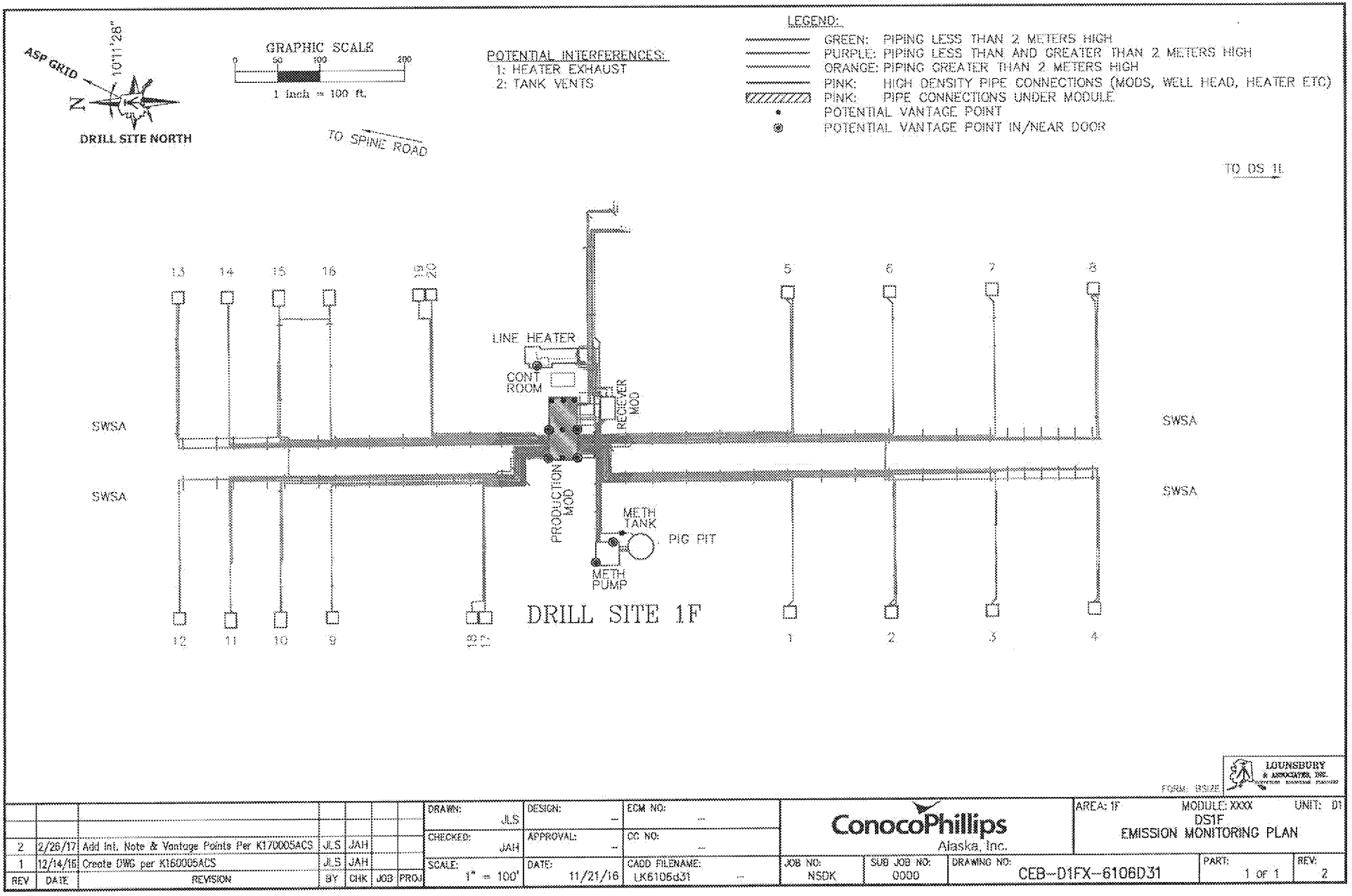


REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/26/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 100'	DATE: 11/21/16	CADD FILENAME: LK6106d31	--

ConocoPhillips Alaska, Inc.

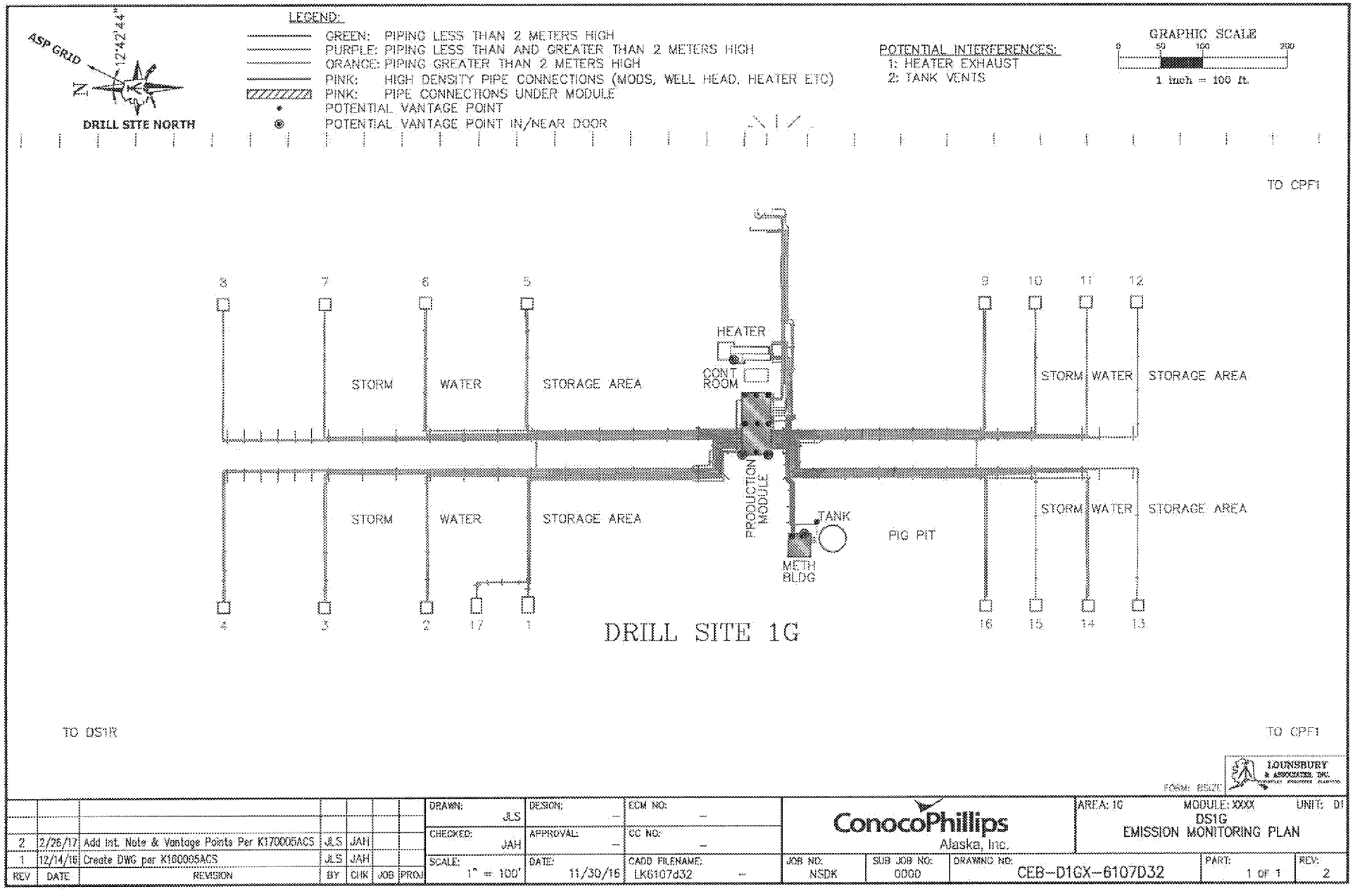
JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB-D1FX-6106D31	PART: 1 OF 1	REV: 2

AREA: 1F MODULE: XXXX UNIT: D1

DS1F
EMISSION MONITORING PLAN

FORM: B SIZE

LOUNSBURY & ASSOCIATES, INC.



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/26/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LK6107d32 --

ConocoPhillips Alaska, Inc.

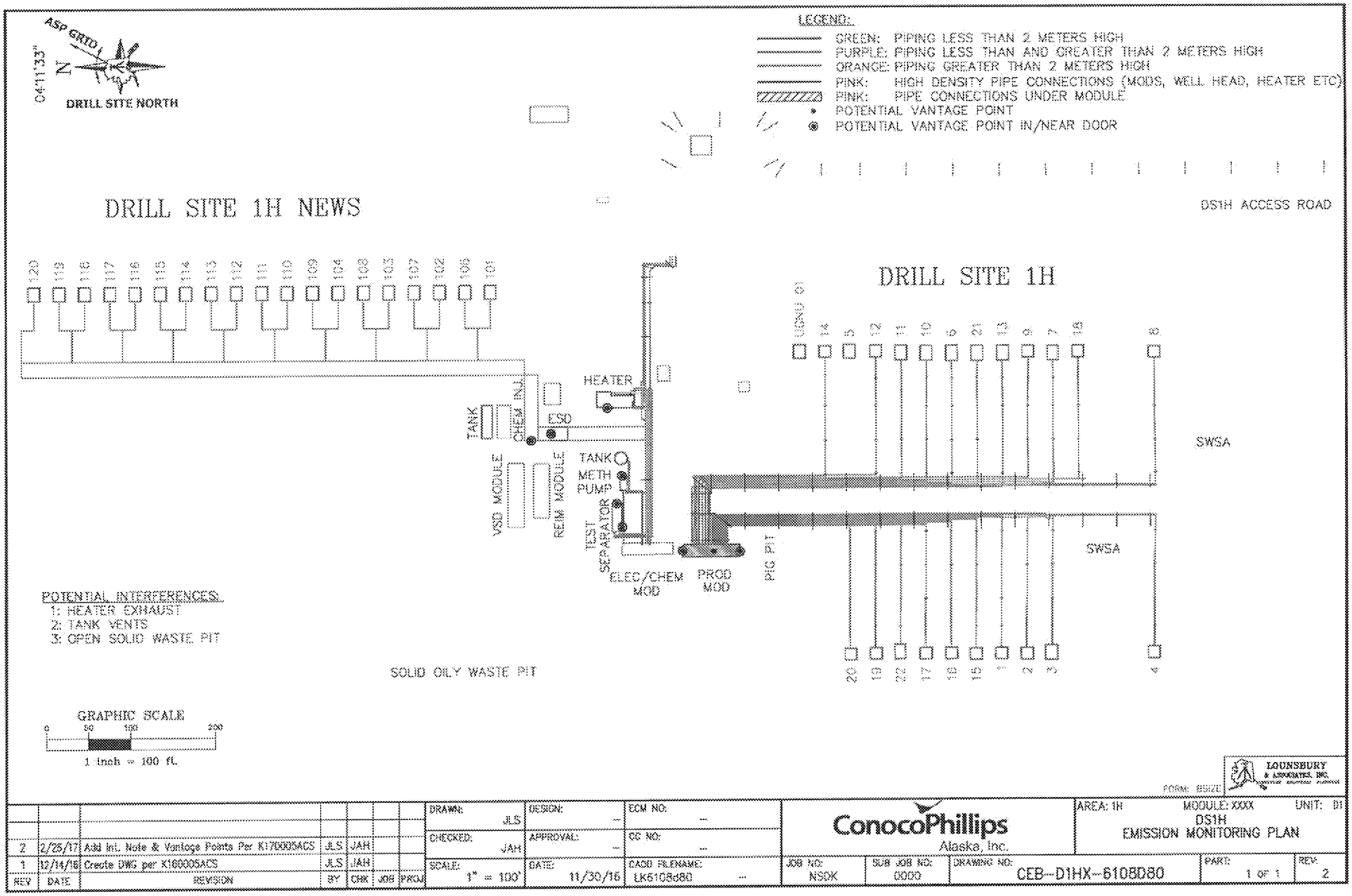
JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D1GX-6107D32 | PART: 1 OF 1 | REV: 2

AREA: 1G | MODULE: XXXX | UNIT: D1

DS1G
EMISSION MONITORING PLAN

FORM: BSI2F

LOUNSBURY & ASSOCIATES, INC.



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/25/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LK6105d80 --

ConocoPhillips Alaska, Inc.

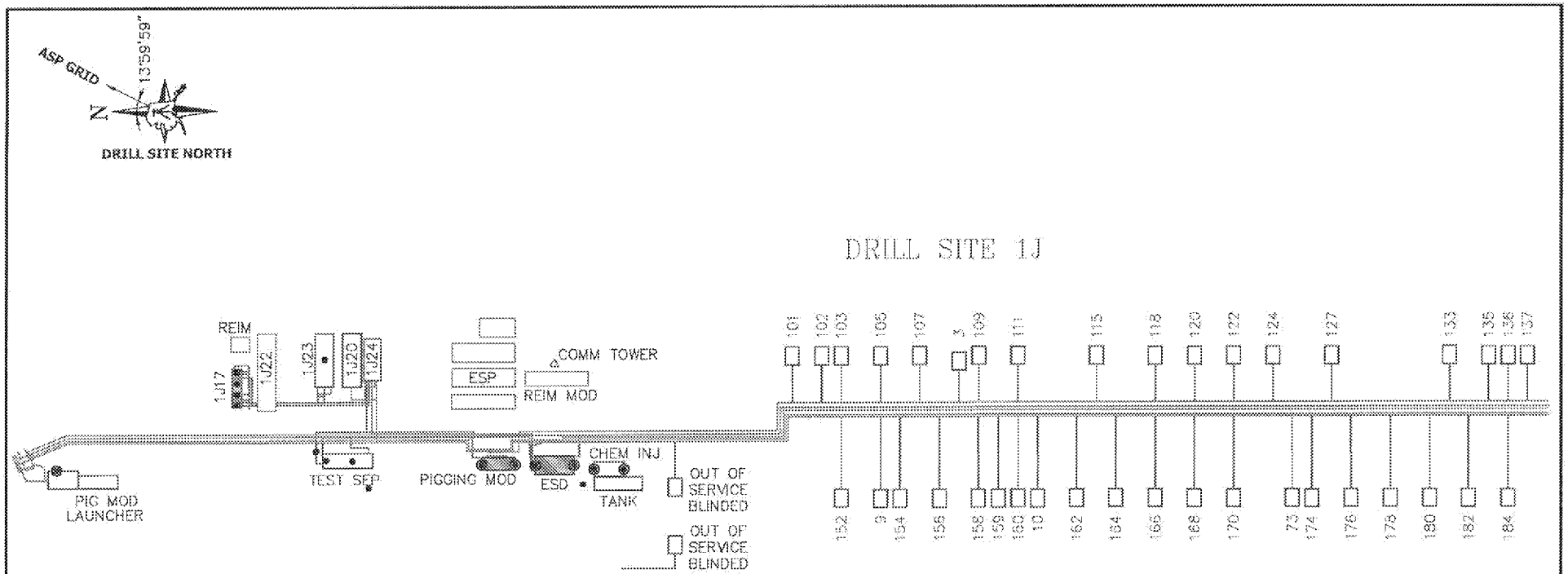
JOB NO: N50K | SUB JOB NO: 0000 | DRAWING NO: CEB--D1HX--6105D80 | PART: 1 OF 1 | REV: 2

AREA: 1H | MODULE: XXXX | UNIT: 01

DS1H
EMISSION MONITORING PLAN

LOUNSBURY & ASSOCIATES, INC.

FORM: 8SIZE



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: A1SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/26/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

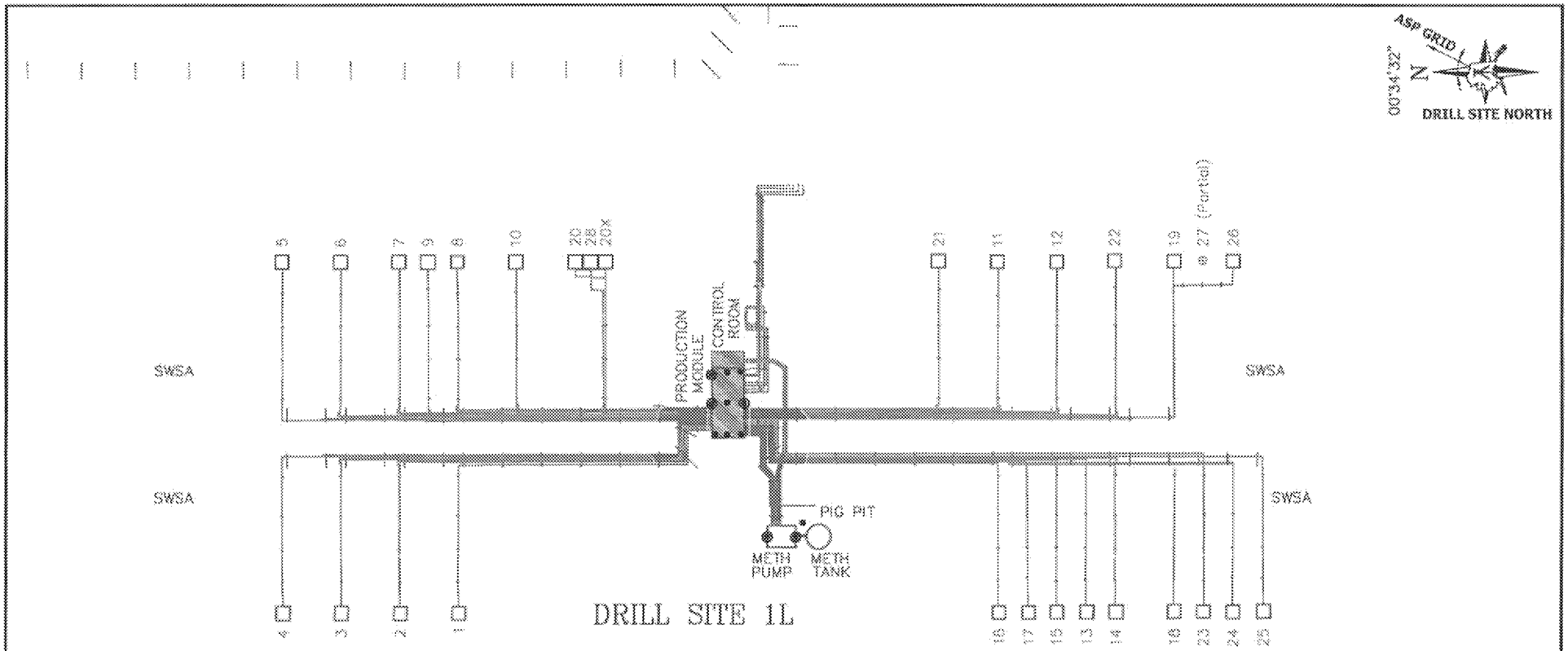
DRAWN: JLS | DESIGN: -- | ECM NO: -- | CHECKED: JAH | APPROVAL: -- | CC NO: -- | SCALE: 1" = 100' | DATE: 11/21/16 | CADD FILENAME: LK6110d53 --

ConocoPhillips Alaska, Inc.

AREA: 1J | MODULE: XXXX | UNIT: D1

DS1J
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D1JX-6110D53 | PART: 1 OF 1 | REV: 2



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1. TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 85127

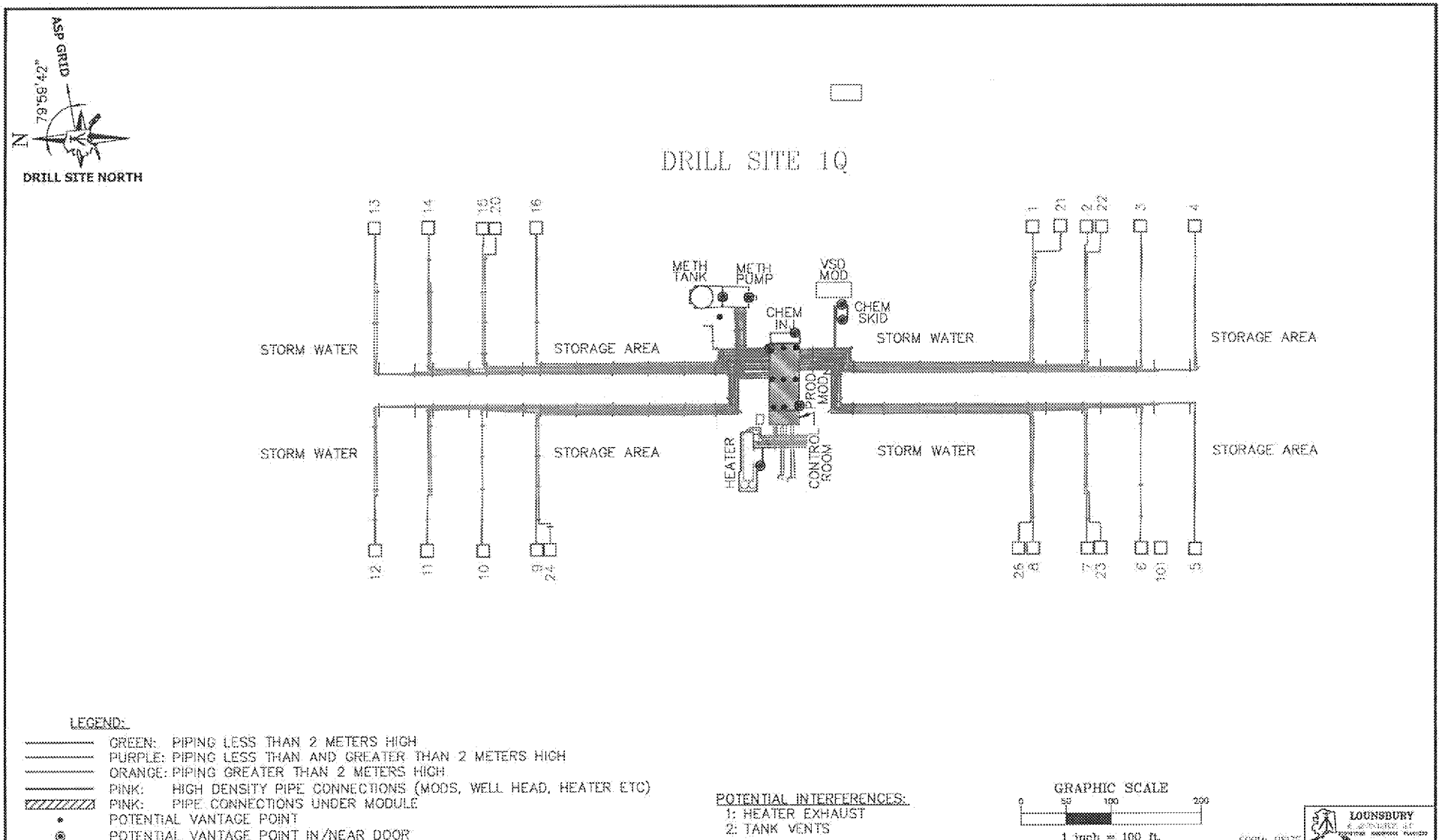
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	12/28/17	Add Int. Note & Vantage Points Per K1700035ACS	JLS	JAH		
1	12/14/16	Create DWG per K1600085ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LX6112d57 --

ConocoPhillips Alaska, Inc.

JOB NO: N50K | SUB JOB NO: 0000 | DRAWING NO: CEB-D1LX-6112D57 | PART: 1 OF 1 | REV: 2

AREA: 1L | MODULE: XXXX | UNIT: D1
DS1L
EMISSION MONITORING PLAN



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

LOUNSBURY

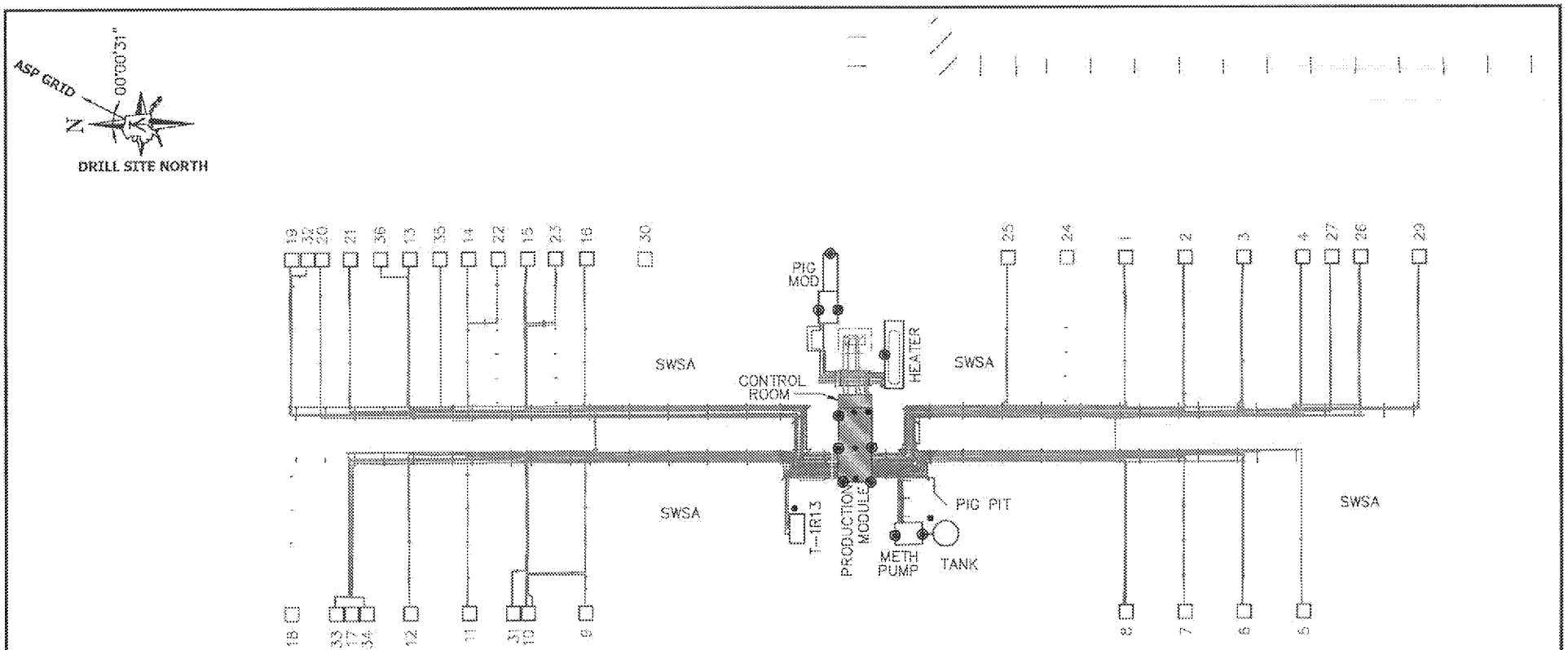
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/28/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LK6117d34 –

ConocoPhillips Alaska, Inc.

AREA: 1Q | MODULE: XXXX | UNIT: D1
DS1Q
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D1QX-6117034 | PART: 1 OF 1 | REV: 2



DRILL SITE 1R

LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR
- SWSA STORM WATER STORAGE AREA

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
3	9/18/17	Pigging Module Addition Per K170005ACS	JLS	LGM		
2	2/26/17	Add int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

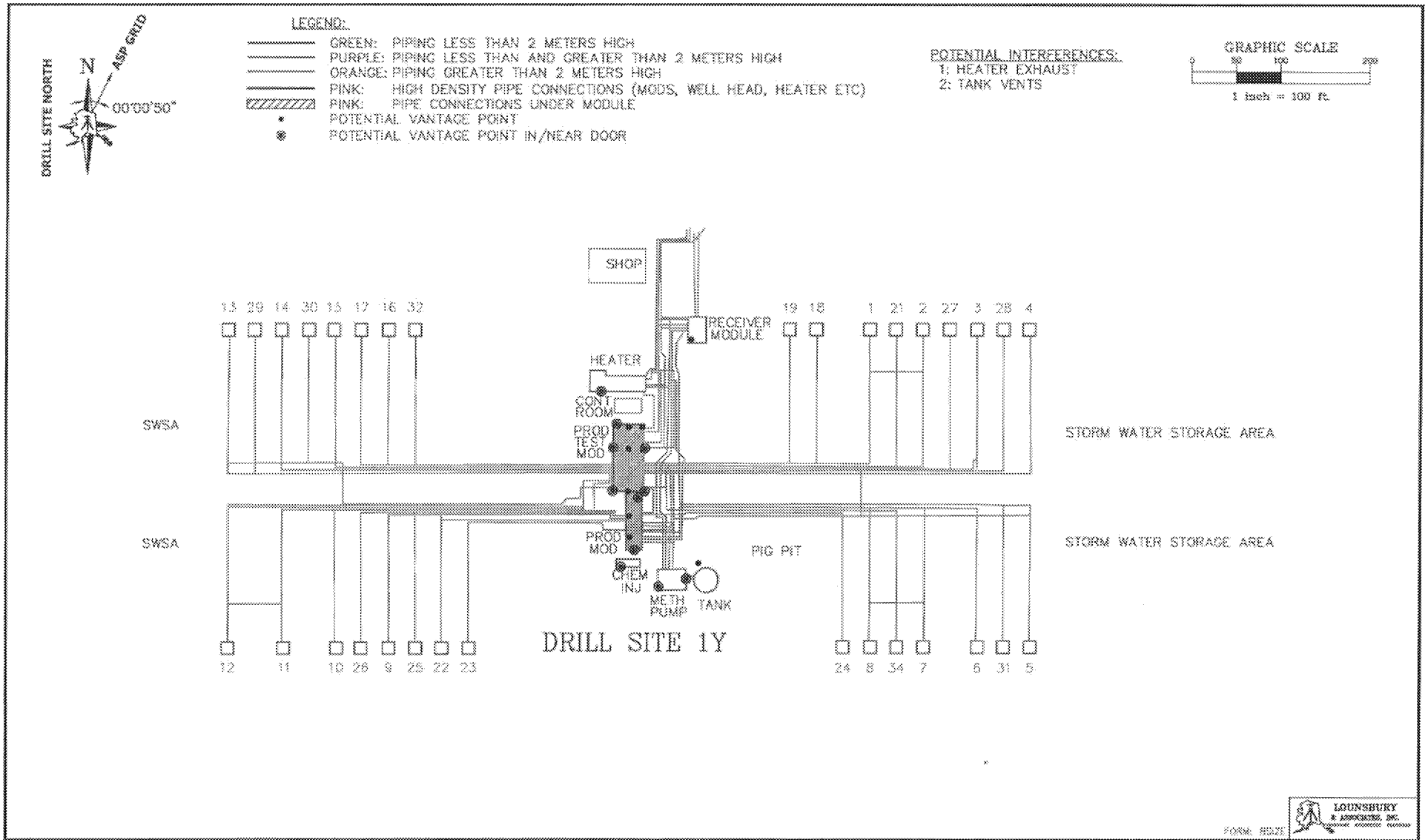
DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 100'	DATE: 11/30/16	CADD FILENAME: LK6118d49	--

ConocoPhillips Alaska, Inc.

JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB-D1RX-6118D49	PART: 1 OF 1	REV: 3

AREA: 1R MODULE: XXXX UNIT: D1

DS1R
EMISSION MONITORING PLAN



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/28/17	Add Int. Note & Vantage Points Per K175005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160035ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | COM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LK6125d38 --

ConocoPhillips Alaska, Inc.

AREA: 1Y | MODULE: XXXX | UNIT: D1
D51Y
EMISSION MONITORING PLAN

JOB NO: N50K | SUB JOB NO: 0000 | DRAWING NO: CEB-D1YX-6125038 | PART: 1 of 1 | REV: 2

LOUNSBURY & ASSOCIATES, INC.

FORM: 8511X

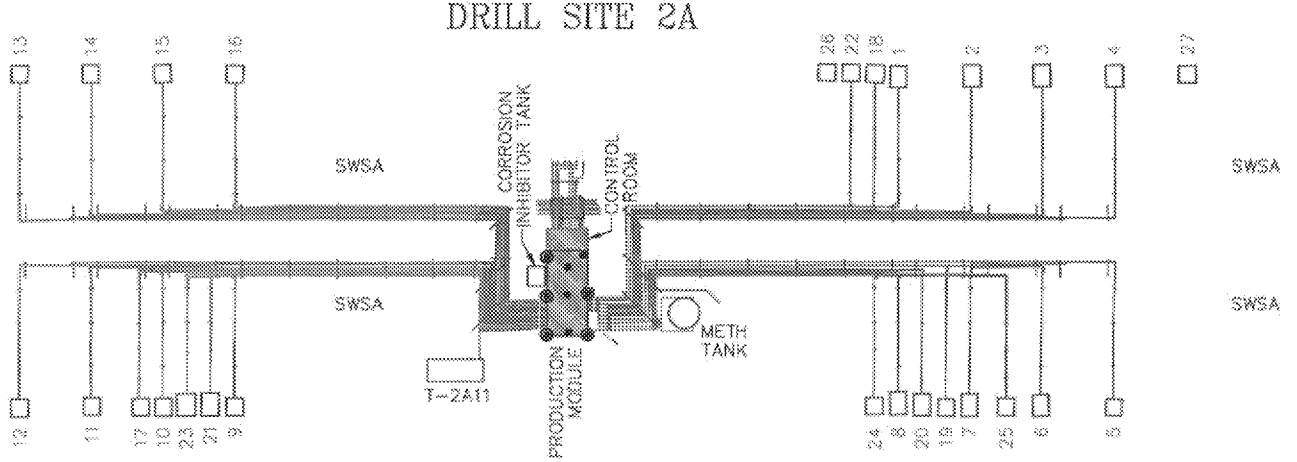
LEGEND:

GREEN: PIPING LESS THAN 2 METERS HIGH
PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
ORANGE: PIPING GREATER THAN 2 METERS HIGH
PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
PINK: PIPE CONNECTIONS UNDER MODULE
POTENTIAL VANTAGE POINT
POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: TANK VENTS

GRAPHIC SCALE
50 100 200
1 inch = 100 ft.

DRILL SITE NORTH
ASP GRID
00°00'03"



FORM: 8512

LOUNSBURY & ASSOCIATES, INC.

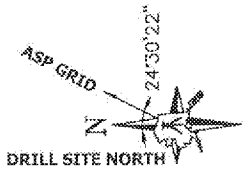
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K17005ACS	JLS	JAH		
1	12/14/16	Create DWG per K16006ACS	JLS	JAH		

DRAWN: JLS | DESIGN: - | ECM NO: -
CHECKED: JAH | APPROVAL: - | CC NO: -
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LK6201d54 -

ConocoPhillips Alaska, Inc.

AREA: 2A | MODULE: XXXX | UNIT: D2
DS2A
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0800 | DRAWING NO: CEB-D2AX-6201DS4 | PART: 1 of 1 | REV: 2



GRAPHIC SCALE

0 50 100 200

1 inch = 100 ft.

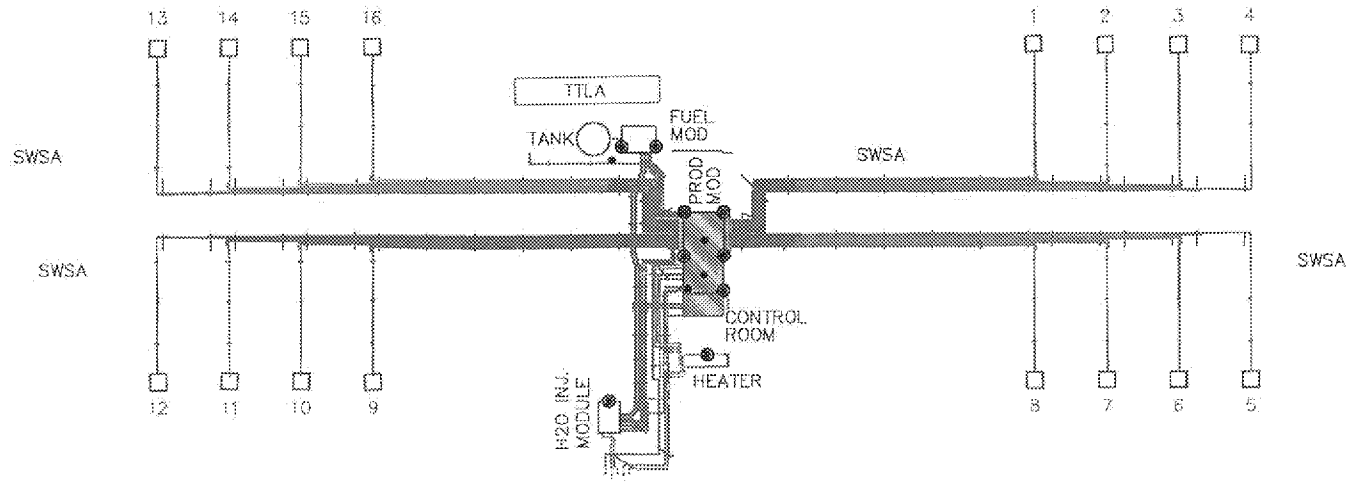
POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

LEGEND:
- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

TO DS2M

TO CPF2

DRILL SITE 2B



FORM: B SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/17/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

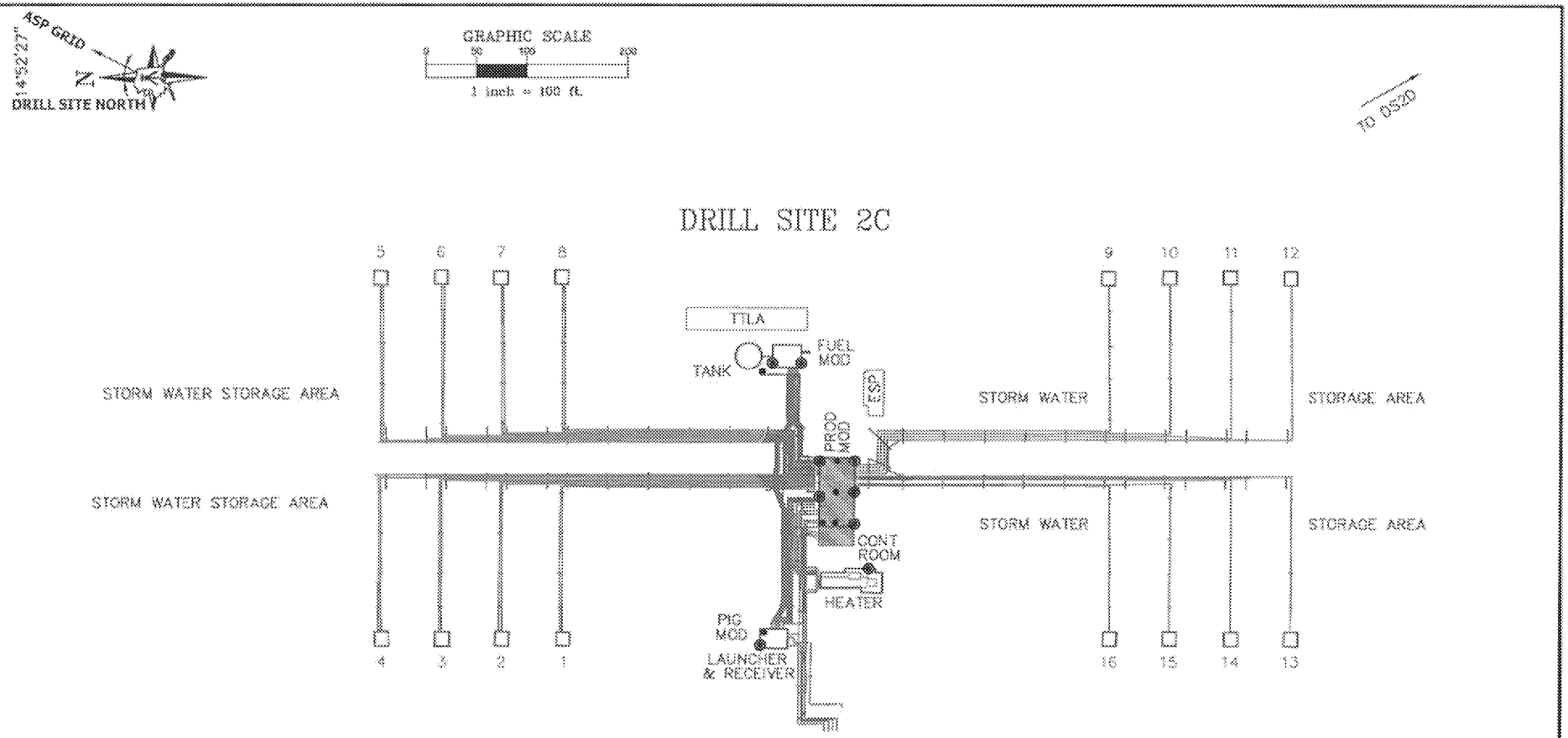
DRAWN: JLS	DESIGN: -	EOM NO: -	
CHECKED: JAH	APPROVAL: -	CC NO: -	
SCALE: 1" = 100'	DATE: 11/30/16	CADD FILENAME: LK6202d23 -	

ConocoPhillips Alaska, Inc.

JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB-D2BX-6202D23	PART: 1 OF 1	REV: 2

AREA: 2B MODULE: XXXX UNIT: 02

DS2B
EMISSION MONITORING PLAN



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

FORM: 8512E

LOUNSBURY & ASSOCIATES, INC.

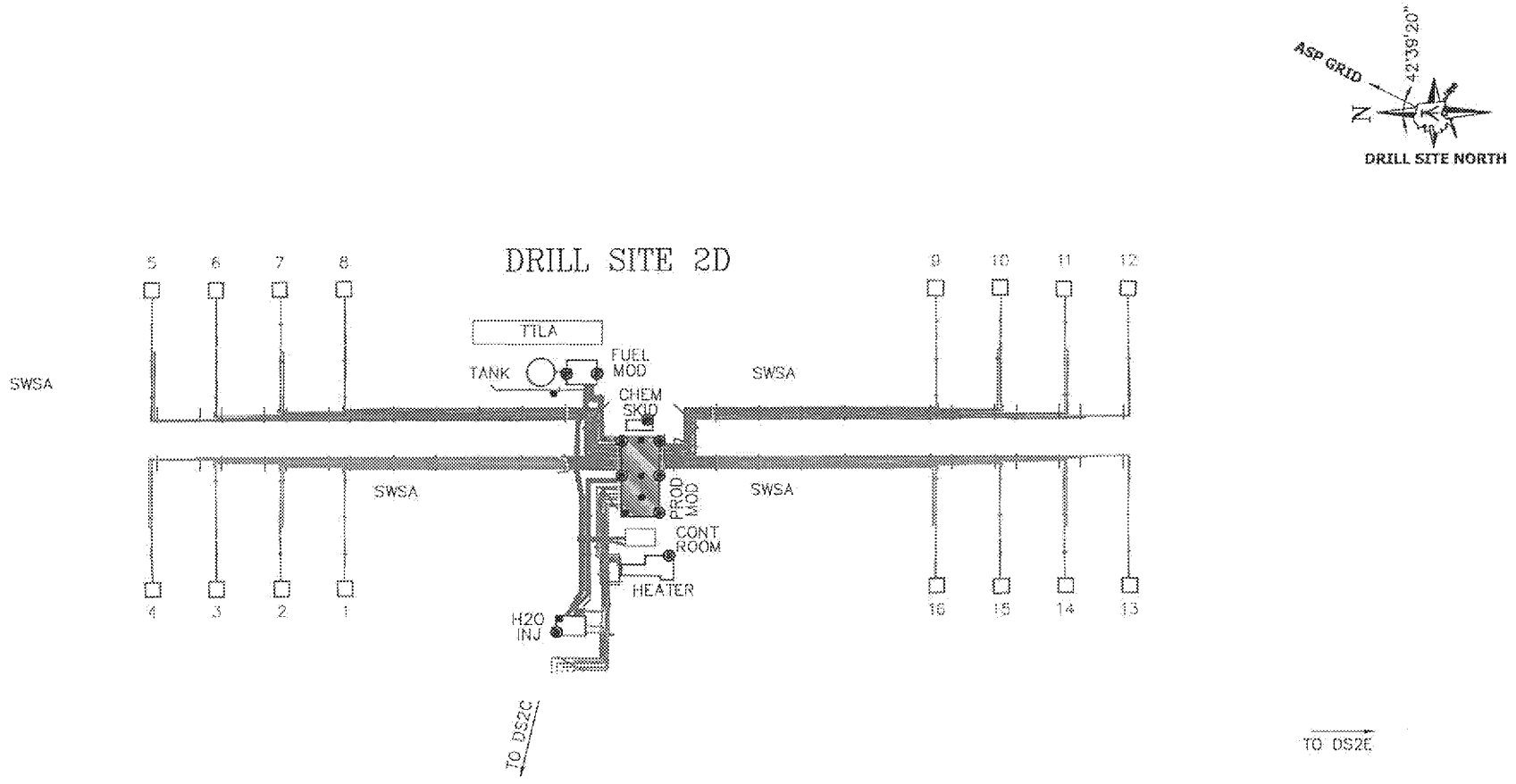
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K17000SACS	JLS	JAH		
1	12/14/16	Create DWG per K16000SACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 11/30/16 | CADD FILENAME: LK6203d25 --

ConocoPhillips Alaska, Inc.

AREA: 2C | MODULE: XXXX | UNIT: D2
DS2C
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D2CX-6203D25 | PART: 1 OF 1 | REV: 2



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN:	JLS
CHECKED:	JAH
SCALE:	1" = 100'
DESIGN:	--
APPROVAL:	--
DATE:	12/05/16
ECM NO:	--
CC NO:	--
CADD FILENAME:	LK6204d44

ConocoPhillips Alaska, Inc.

AREA: 2D MODULE: XXXX UNIT: D2

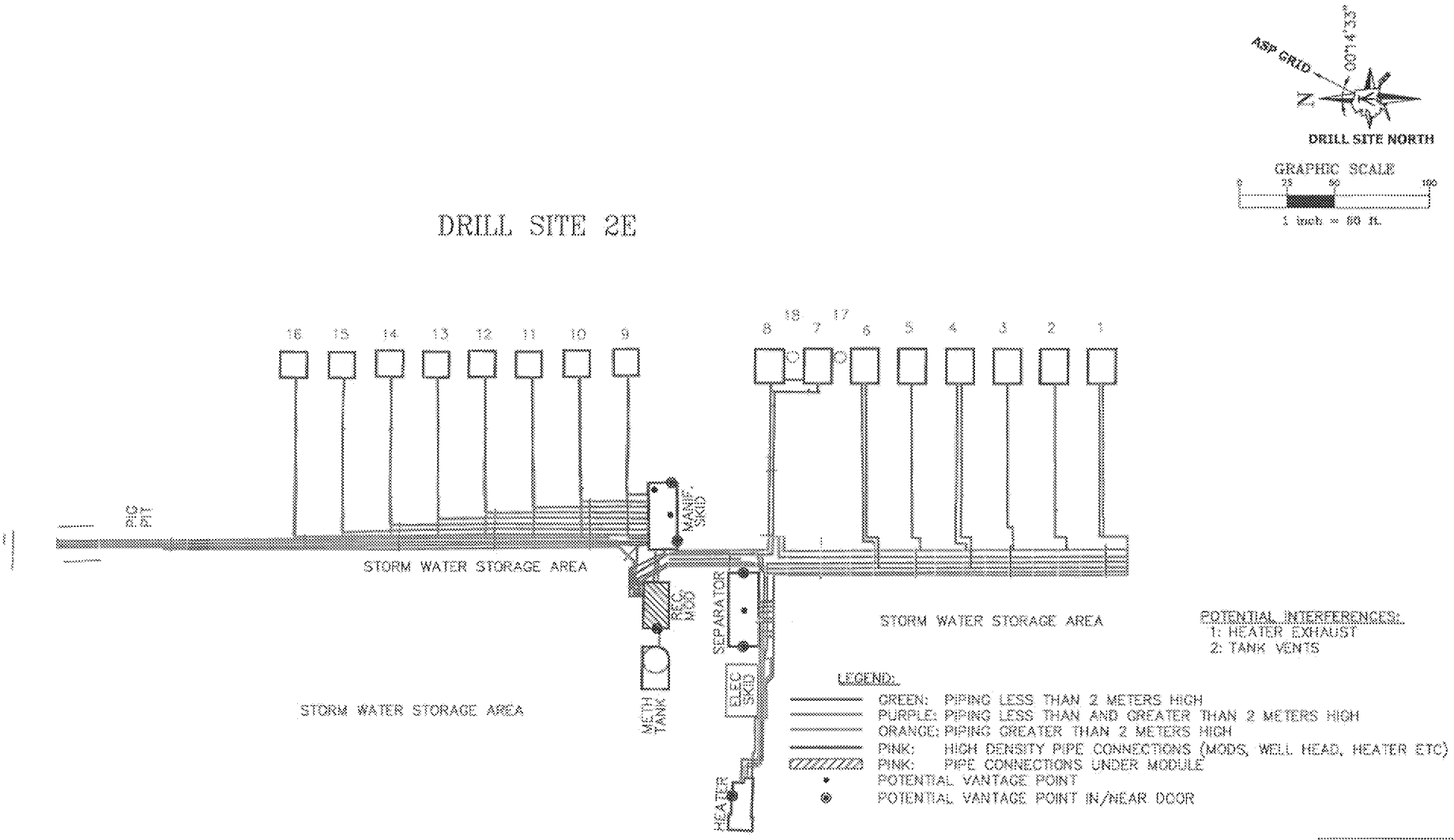
DS2D
EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
NSDK	0000	CEB-D2DX-6204D44	1 OF 1	2

FORM: B/SIZE

LOUNSBURY & ASSOCIATES, INC.

DRILL SITE 2E



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K17005ACS	JLS	JAH		
1	12/14/16	Create DWG per K16001SACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | EDM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 50' | DATE: 12/06/16 | CADD FILENAME: LK6205d27 --

ConocoPhillips Alaska, Inc.

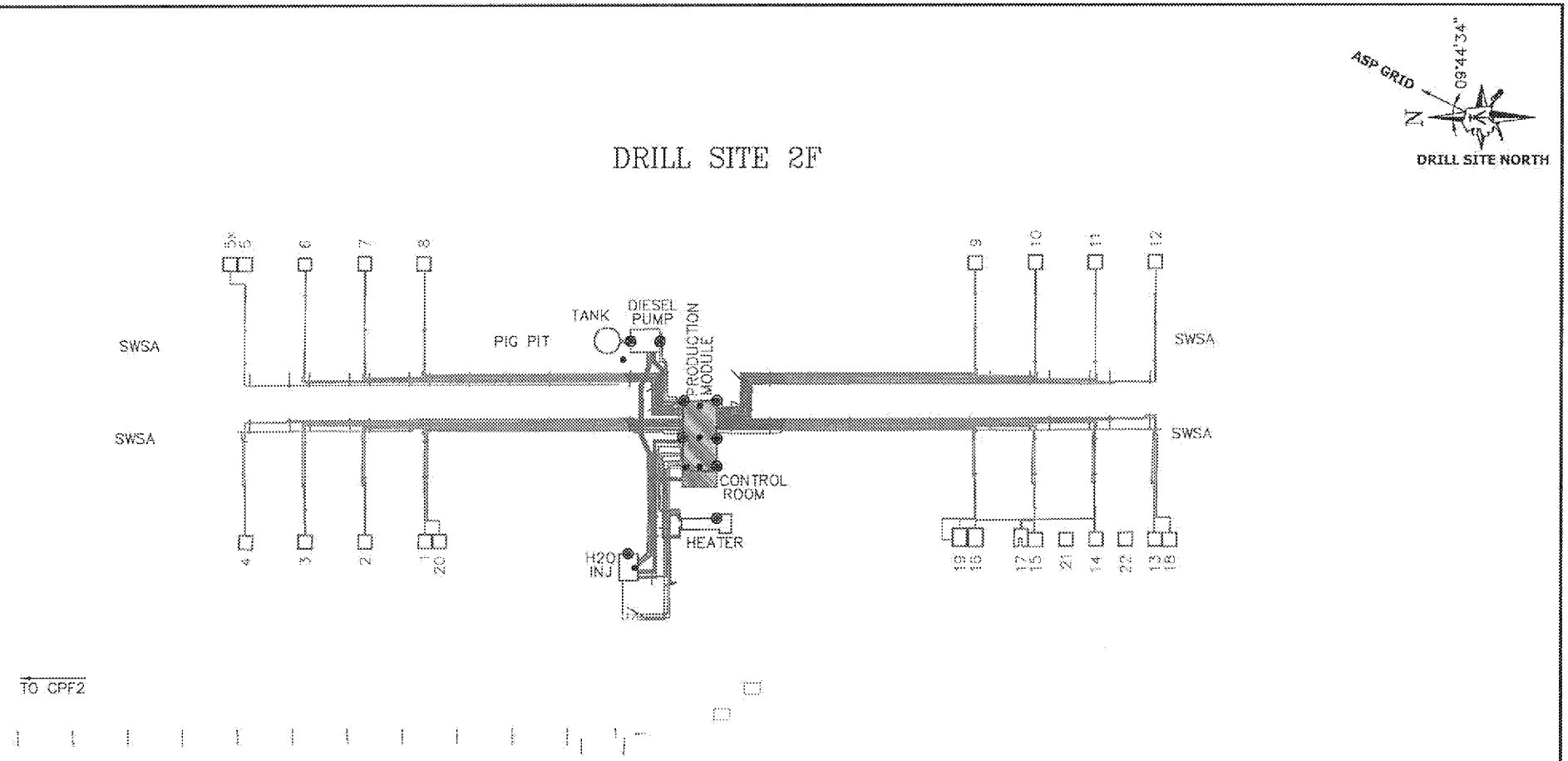
AREA: 2E | MODULE: XXXX | UNIT: D2
DS2E
EMISSION MONITORING PLAN

JOB NO: N50K | SUB JOB NO: 0000 | DRAWING NO: CEB-D2EX-6205D27 | PART: 1 OF 1 | REV: 2

LOUNSBURY & ASSOCIATES, INC.

FORM: 05528

DRILL SITE 2F



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

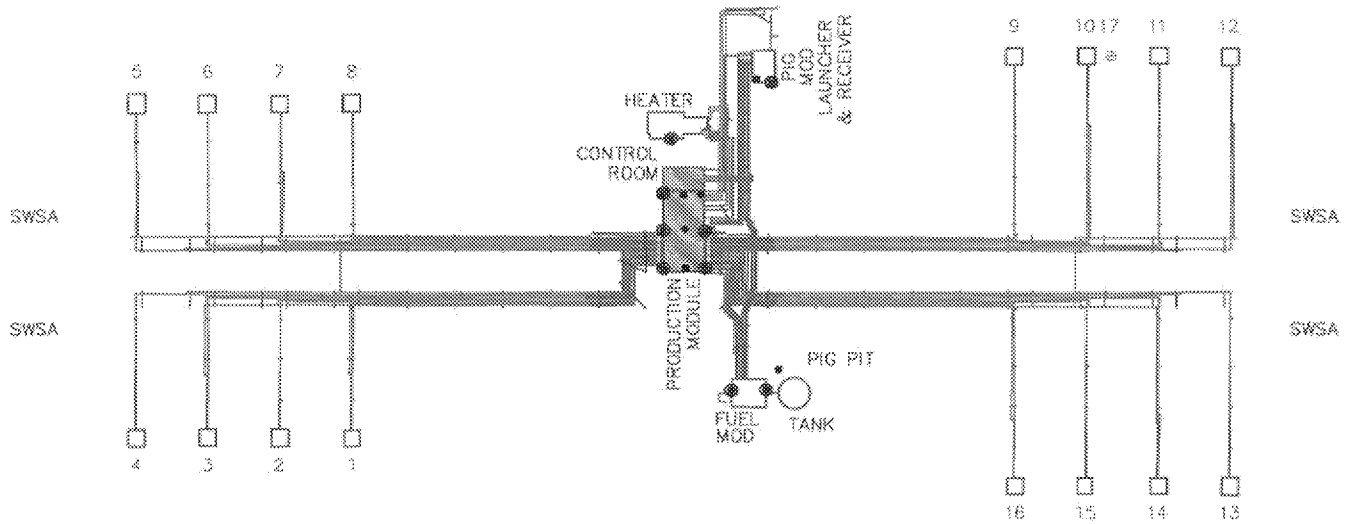
DRAWN: JLS	DESIGN: –	ECM NO: –	
CHECKED: JAH	APPROVAL: –	CC NO: –	
SCALE: 1" = 100'	DATE: 12/06/16	CADD FILENAME: LK6206d19 –	

ConocoPhillips Alaska, Inc.

JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB-D2FX-6206D19	PART: 1 OF 1	REV: 2

AREA: 2F MODULE: XXXX UNIT: D2
DS2F
EMISSION MONITORING PLAN

DRILL SITE 2G



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- * POTENTIAL VANTAGE POINT
- ◉ POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 100 200
1 inch = 100 ft.

FORM: DS2E

LOUNSBURY & ASSOCIATES, INC.

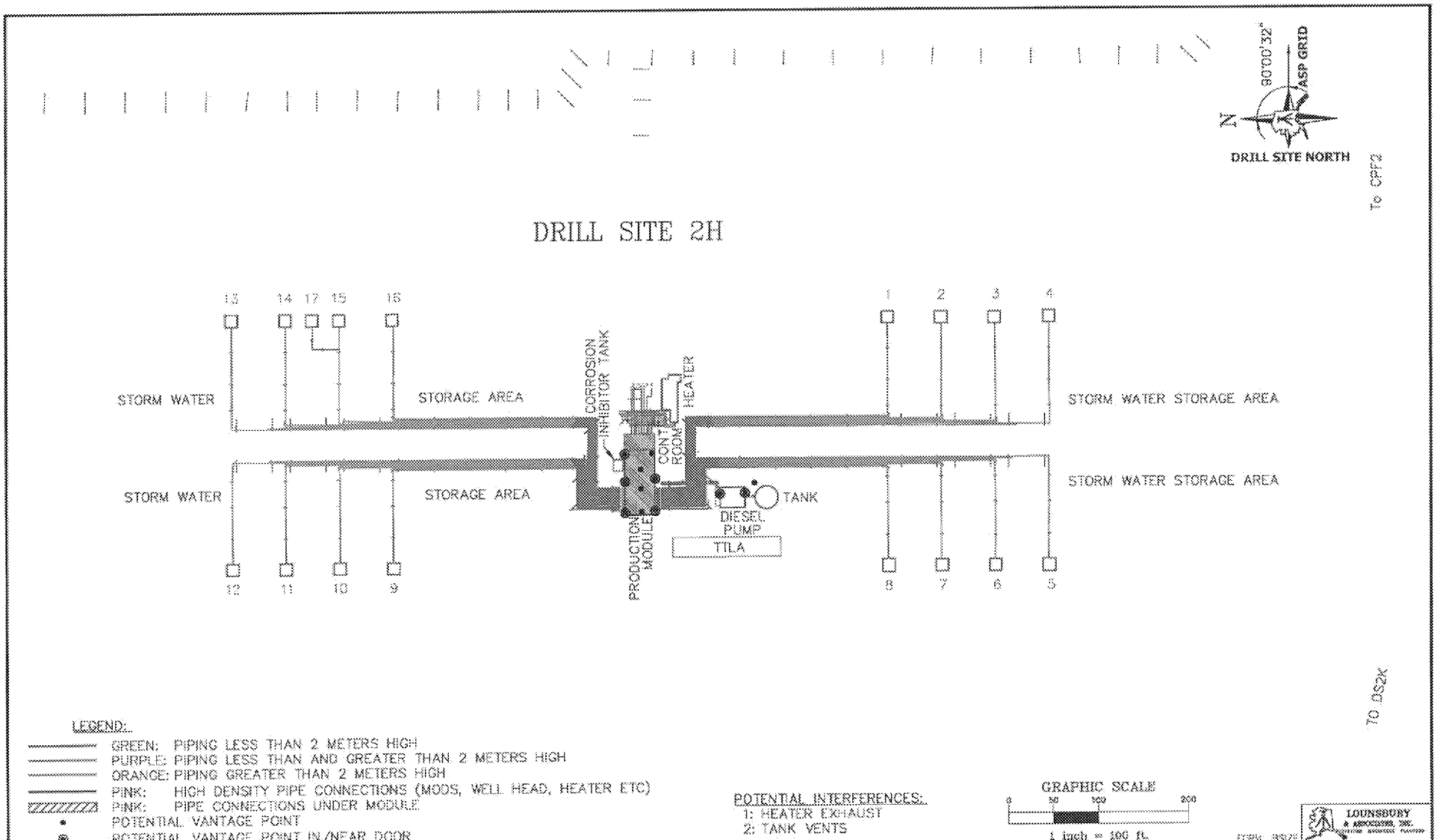
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K17003ACS	JLS	JAH		
1	12/14/16	Create DWG per K16000SACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | DC NO: –
SCALE: 1" = 100' | DATE: 12/06/16 | CADD FILENAME: LK6207d30 –

ConocoPhillips Alaska, Inc.

AREA: 2G | MODULE: XXXX | UNIT: D2
DS2G
EMISSION MONITORING PLAN

JOB NO: N5DK | SUB JOB NO: 0000 | DRAWING NO: CEB–D2GX–6207D30 | PART: 1 OF 1 | REV: 2



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: BS2E

LOUNSBURY & ASSOCIATES, INC.

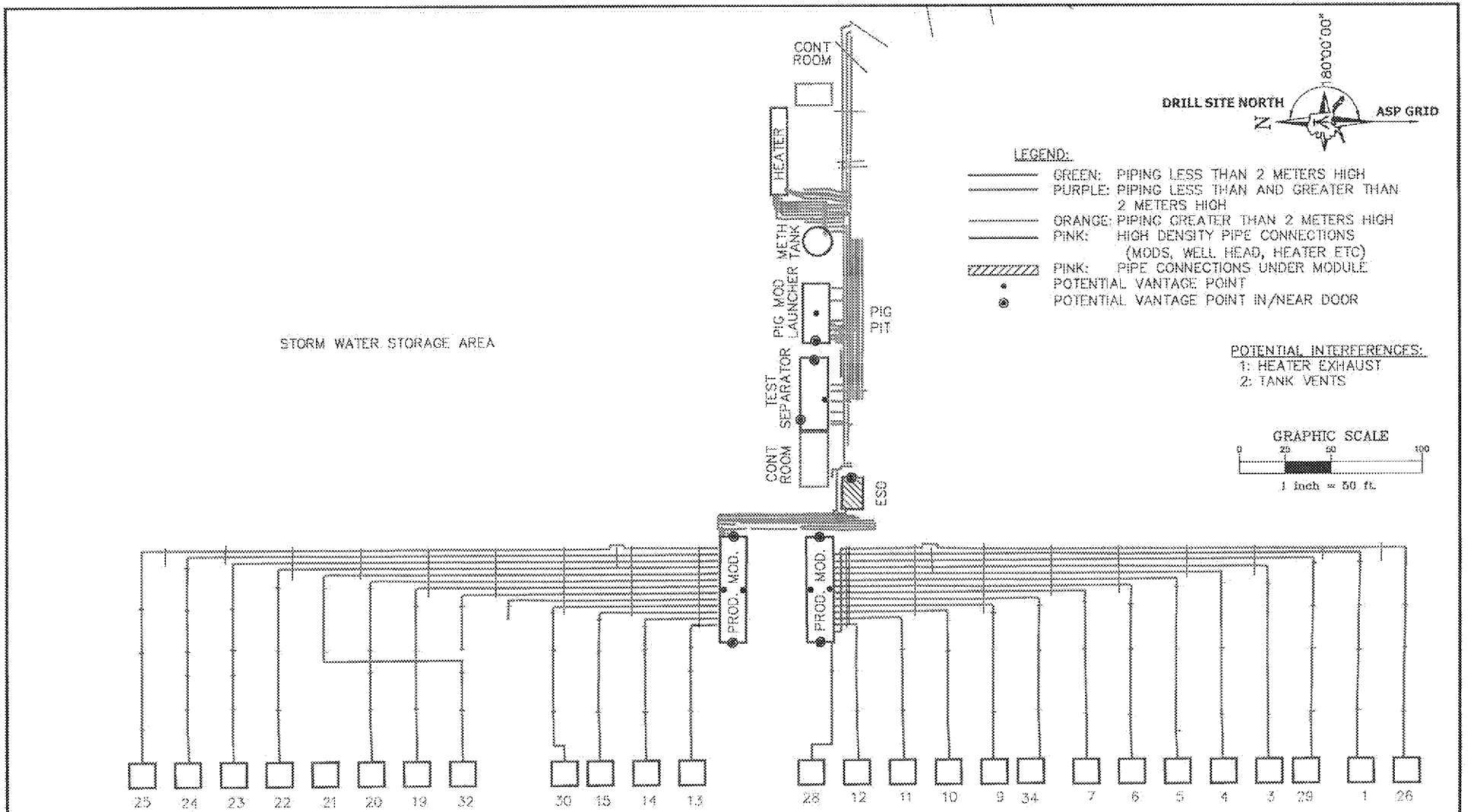
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160305ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | EGM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 100' | DATE: 12/06/16 | CADD FILENAME: LK6208d28 –

ConocoPhillips Alaska, Inc.

AREA: 2H | MODULE: XXXX | UNIT: D2
DS2H
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D2HX-6208D28 | PART: 1 OF 1 | REV: 2



DRILL SITE 2K

REV	DATE	REVISION	BY	CHK	JOB	PROJ
3	9/21/17	Edited Wells and Wellines Per K170005ACS	LGM	JSL		
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 50' | DATE: 12/06/16 | CADD FILENAME: LK6211d34 –

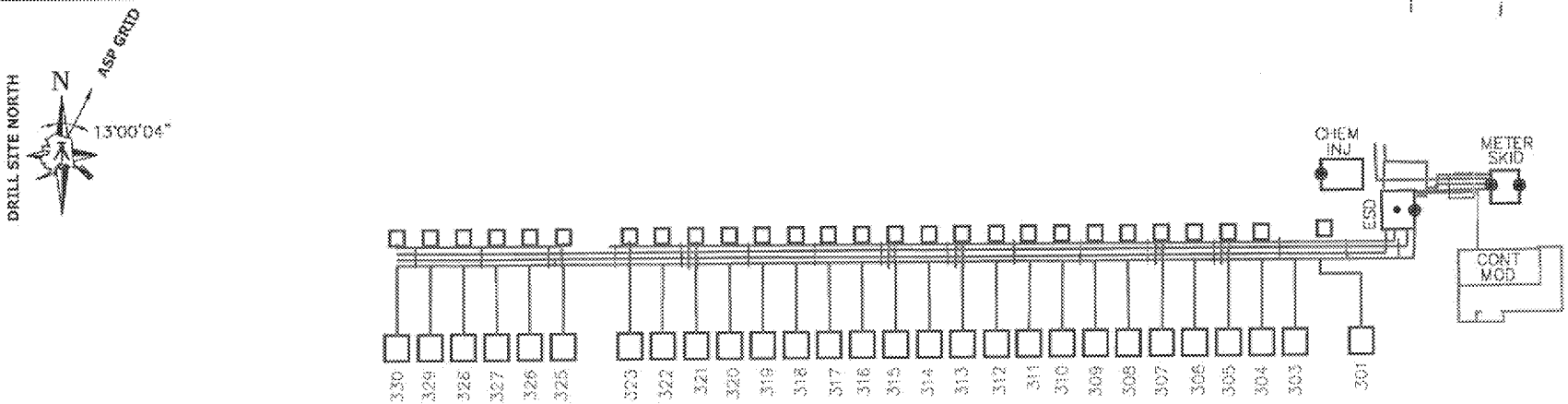
ConocoPhillips Alaska, Inc.

AREA: 2K | MODULE: XXXX | UNIT: 02
D52K
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D2KX-6211D34 | PART: 1 OF 1 | REV: 3

LOUNSBURY & ASSOCIATES, INC.

FORM: B22VZ



DRILL SITE 2L

LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: GENERATOR EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 25 50 100
1 inch = 50 ft.

FORM: 8½X11

LOUNSBURY & ASSOCIATES, INC.

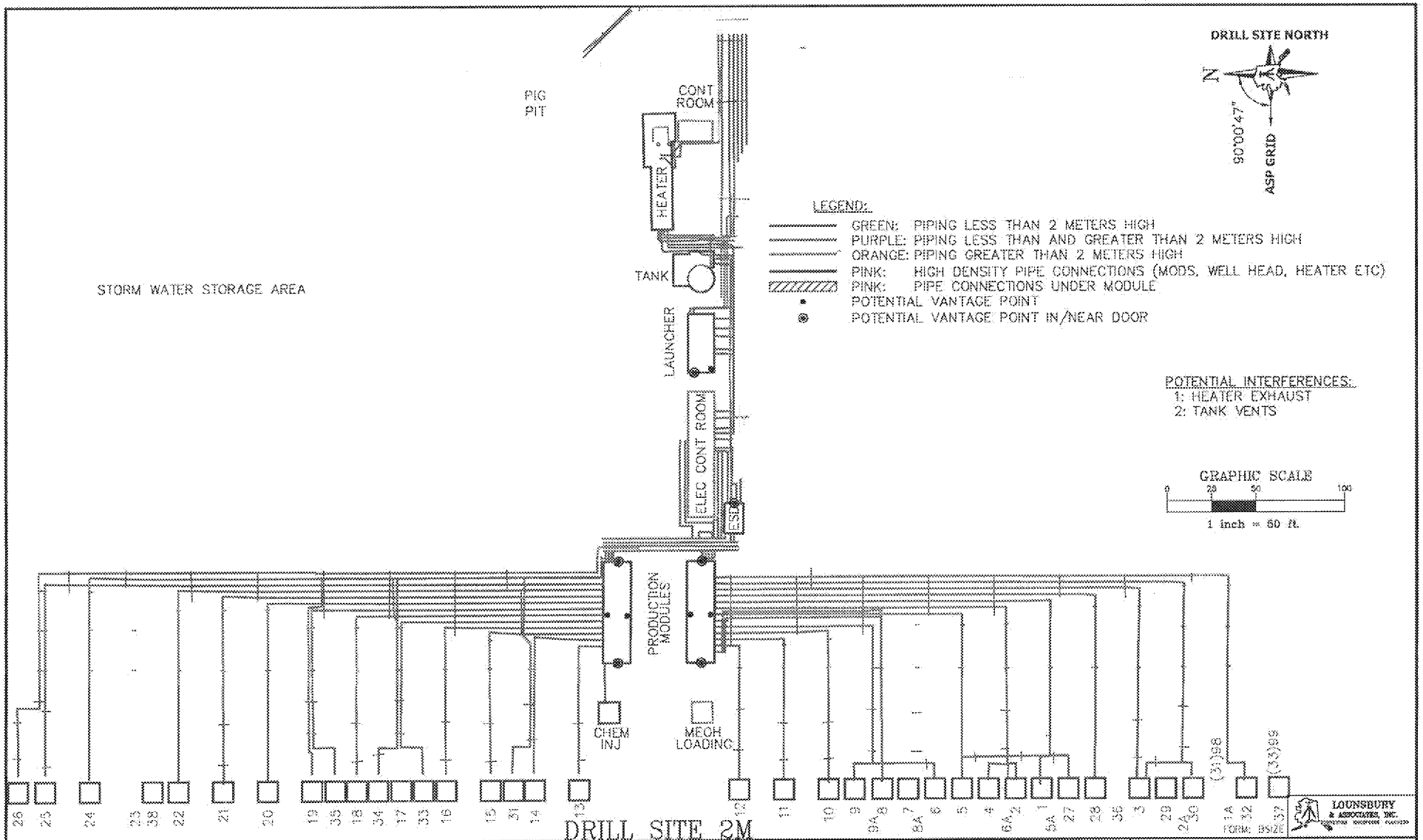
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170025ACS	JLS	JAH		
1	12/14/16	Create DWG per K160035ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 50' | DATE: 12/06/16 | CADD FILENAME: LK6212d67 --

ConocoPhillips Alaska, Inc.

AREA: 2L MODULE: XXXX UNIT: 02
DS2L
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 6000 | DRAWING NO: CEB-D2LX-6212D67 | PART: 1 OF 1 | REV: 2



REV	DATE	REVISION	BY	CHK	JOB	PROJ
3	12/31/17	Add MEOH Loading Per K160005ACS	LGM	JAH		
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

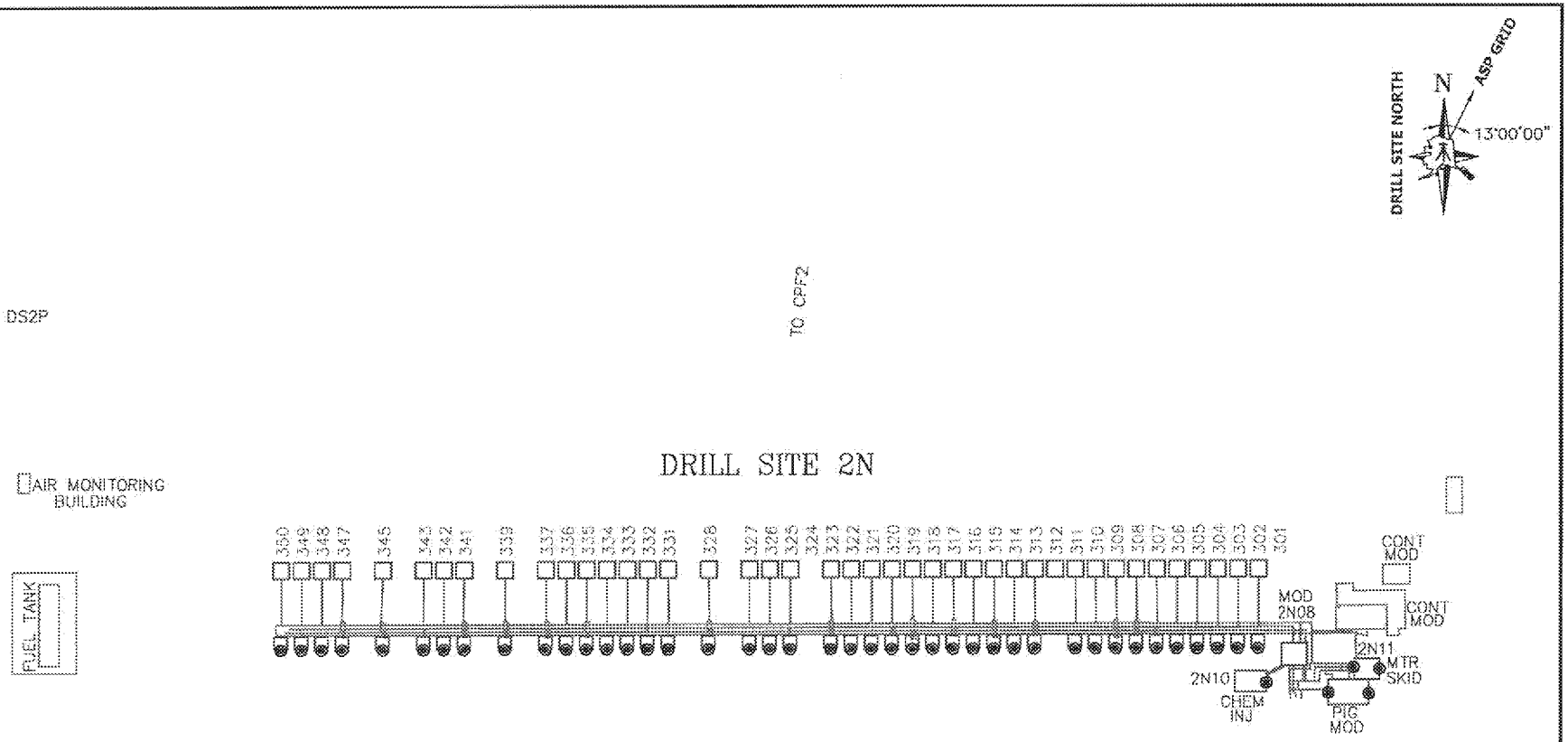
DRAWN: JLS	DESIGN: –	ECM NO: –	
CHECKED: JAH	APPROVAL: –	CC NO: –	
SCALE: 1" = 50'	DATE: 12/06/16	CADD FILENAME: LK6213d42	–

ConocoPhillips Alaska, Inc.

AREA: 2M MODULE: XXXX UNIT: D2

DS2M
EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
NSDK	0000	CEB-D2MX-6213D42	1 OF 1	3



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- ⊛ POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: GENERATOR EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 40 80 160
1 inch = 80 ft.

FORM: BSIZE

LOUNSBURY & ASSOCIATES, INC.

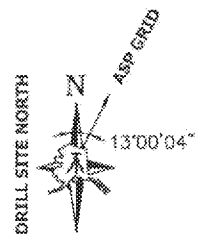
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 80'	DATE: 12/06/16	CADD FILENAME: LK6214d65 --	

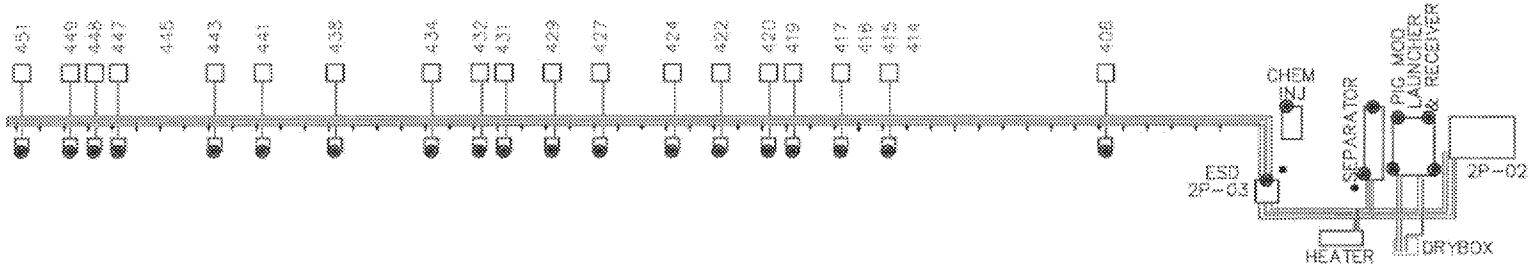
ConocoPhillips Alaska, Inc.

JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB-D2NX-6214D65	PART: 1 OF 1	REV: 2

AREA: 2N MODULE: XXXX UNIT: D2
DS2N
EMISSION MONITORING PLAN



DRILL SITE 2P



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: GENERATOR EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 85X28

LOUNSBURY & ASSOCIATES, INC.

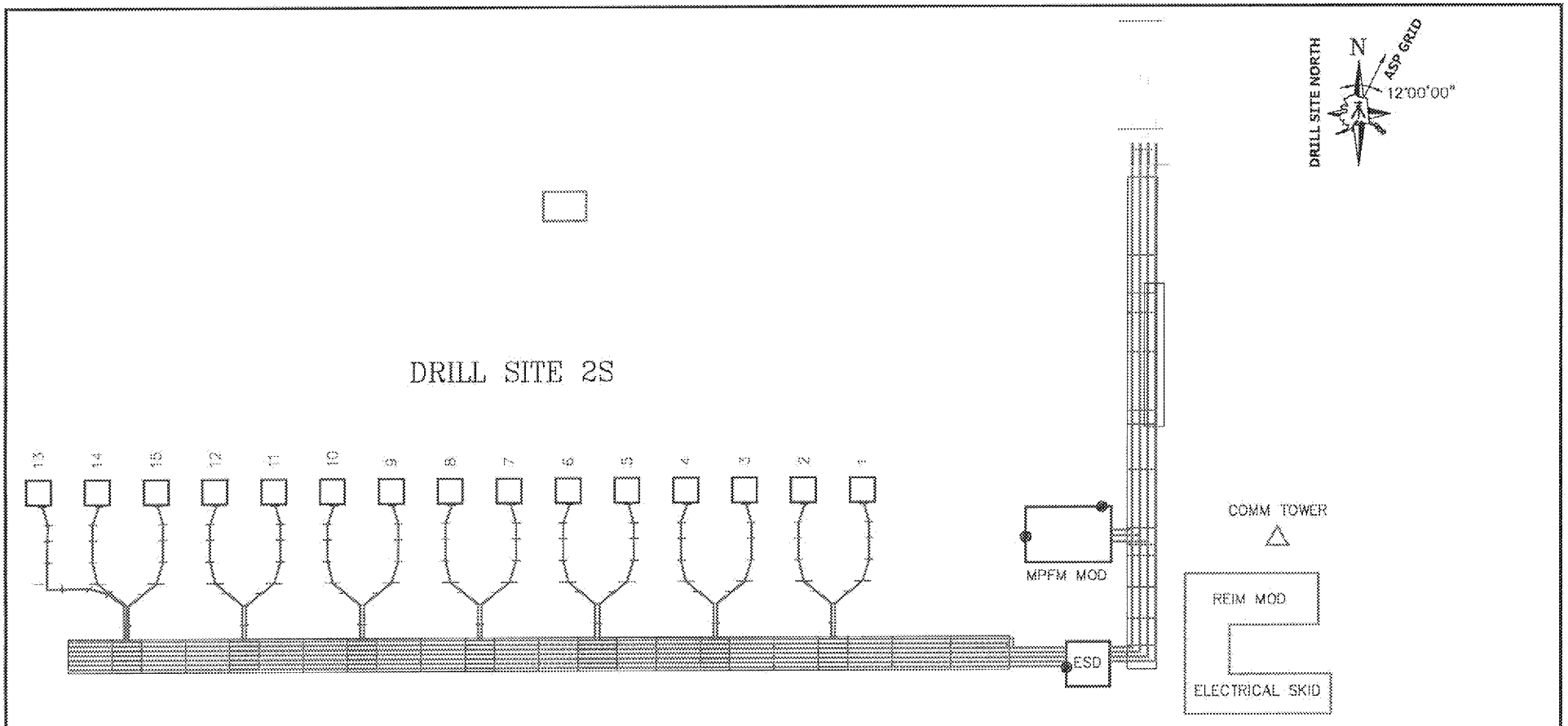
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K1700035ACS	JLS	JAH		
1	12/14/16	Create DWG per K1600035ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 100' | DATE: 12/06/16 | CADD FILENAME: LK6216d62 –

ConocoPhillips Alaska, Inc.

JOB NO: NS0K | SUB JOB NO: 0010 | DRAWING NO: CEB-02PX-6216D62 | PART: 1 OF 1 | REV: 2

AREA: 2P | MODULE: XXXX | UNIT: 02
DS2P
EMISSION MONITORING PLAN



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: GENERATOR EXHAUST

GRAPHIC SCALE
0 25 50 100
1 inch = 50 ft.

FORM SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

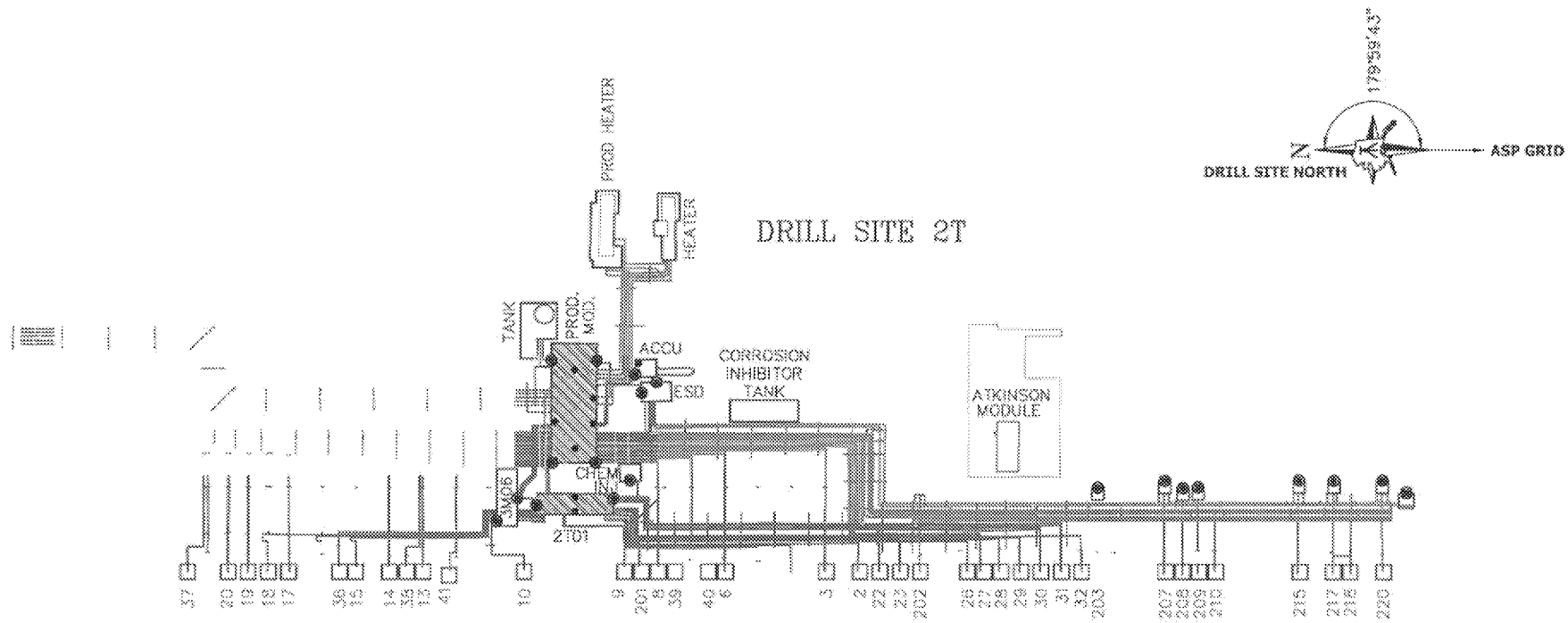
DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 50'	DATE: 12/06/16	CADD FILENAME: LK6219d43 --	

ConocoPhillips Alaska, Inc.

AREA: 2S MODULE: XXXX UNIT: D2

DS2S
EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
NSDK	0000	CEB-D2SX-6219D43	1 OF 1	2



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 40 80 160
1 inch = 80 ft.

FORM: BS12E

REV	DATE	REVISION	BY	CHK	JOB	PROJ
4	12/30/17	Remove Well 4 Per K1800085ACS	JAH	LGM		
3	10/9/17	Remove Well 4 Piping S.T.I.S.U.S.D & 204 Add Well 204 Per K1800044CS	LGM	JLS		
2	2/27/17	Add Int. Note & Vantage Points Per K1700035ACS	JLS	JAH		
1	12/14/16	Create DWG per K1600035ACS	JLS	JAH		

DRAWN: JLS	DESIGN: –	ECM NO: –	
CHECKED: JAH	APPROVAL: –	CC NO: –	
SCALE: 1" = 80'	DATE: 12/08/16	CADD FILENAME: LK6220d54	–

ConocoPhillips Alaska, Inc.

JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB-D2TX-6220D54	PART: 1 OF 1

AREA: 2T MODULE: XXXX UNIT: D2
DS2T
EMISSION MONITORING PLAN

REV: 4

DRILL SITE NORTH

N

ASP GRID

14°00'20"

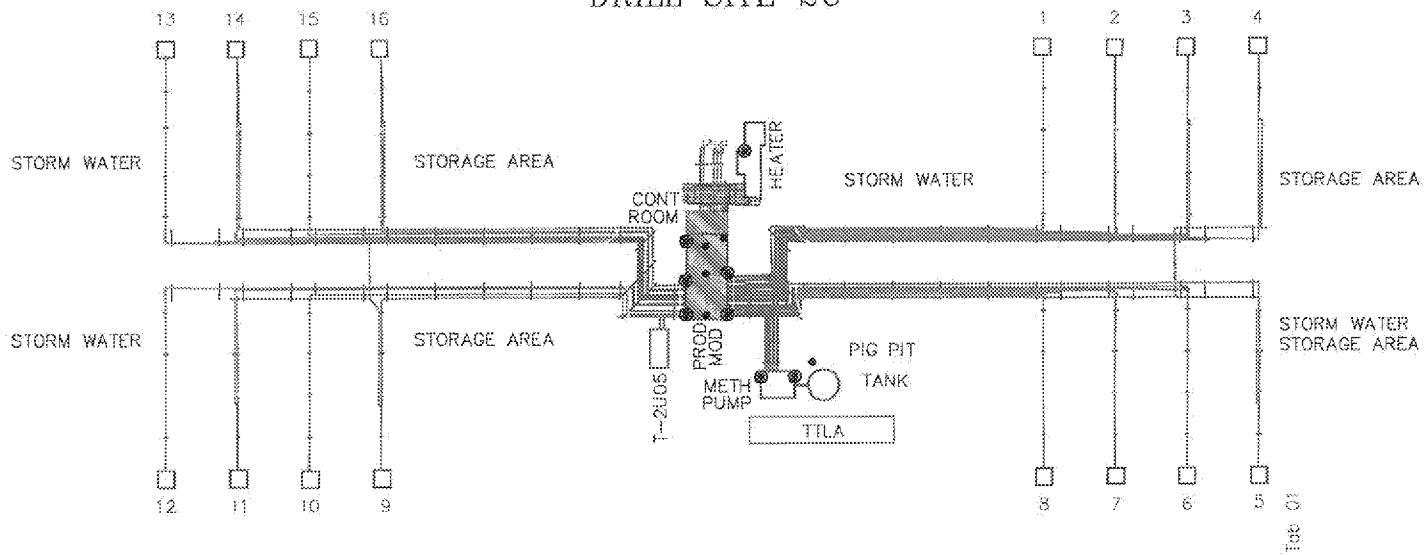
LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

DRILL SITE 2U



LOUNSBURY & ASSOCIATES, INC.

FORM: D5X2E

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K16DDDDSACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 100' | DATE: 12/06/16 | CADD FILENAME: LK6221d34 –

ConocoPhillips Alaska, Inc.

AREA: 2U MODULE: XXXX UNIT: 02
DS2U
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D2UX-6221D34 | PART: 1 of 1 | REV: 2

GRAPHIC SCALE

0 50 100 200

1 inch = 100 ft.

LEGEND:

GREEN: PIPING LESS THAN 2 METERS HIGH
PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
ORANGE: PIPING GREATER THAN 2 METERS HIGH
PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
PINK: PIPE CONNECTIONS UNDER MODULE
POTENTIAL VANTAGE POINT
POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: TANK VENTS

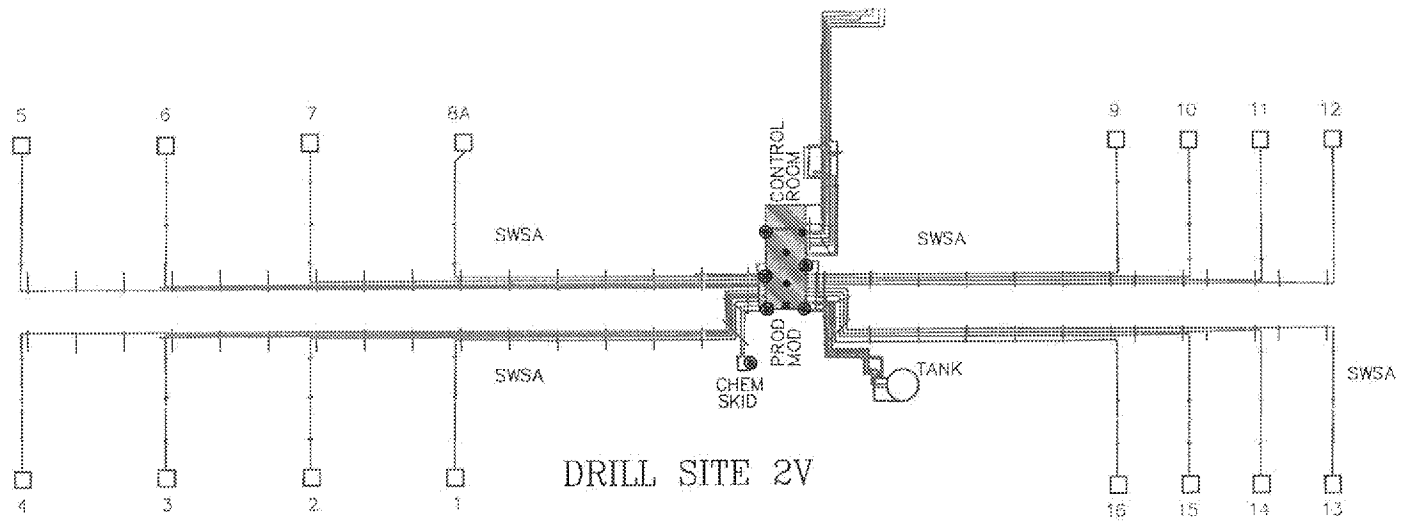
DRILL SITE NORTH

ASP GRID

0°00'20"

TO DS 2W

TO CPF--2



DRILL SITE 2V

LOUNSBURY & ASSOCIATES, INC.

FORM: BSIZE

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create D&C per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CO NO: --	
SCALE: 1" = 100'	DATE: 12/06/16	CADD FILENAME: LK6222d33	--

ConocoPhillips Alaska, Inc.

AREA: 2V MODULE: XXXX UNIT: D2

DS2V
EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
NSDK	0000	CEB--D2VX--6222D33	1 OF 1	2

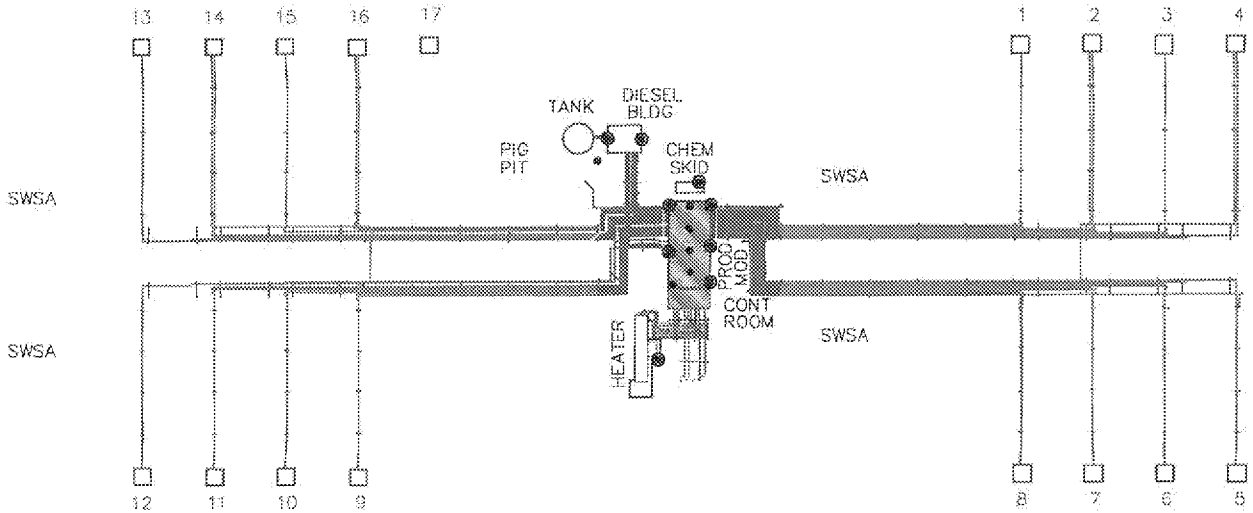
DRILL SITE NORTH

N

ASP GRID

22°02'13"

DRILL SITE 2W



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 100'	DATE: 12/06/16	CADD FILENAME: LK6223d33 --	

ConocoPhillips Alaska, Inc.

JOB NO: NSDK	SUB JOB NO: 0000	DRAWING NO: CEB--D2WX--6223D33	PART: 1 OF 1	REV: 2

AREA: 2W MODULE: XXXX UNIT: D2

DS2W
EMISSION MONITORING PLAN

LEGEND:

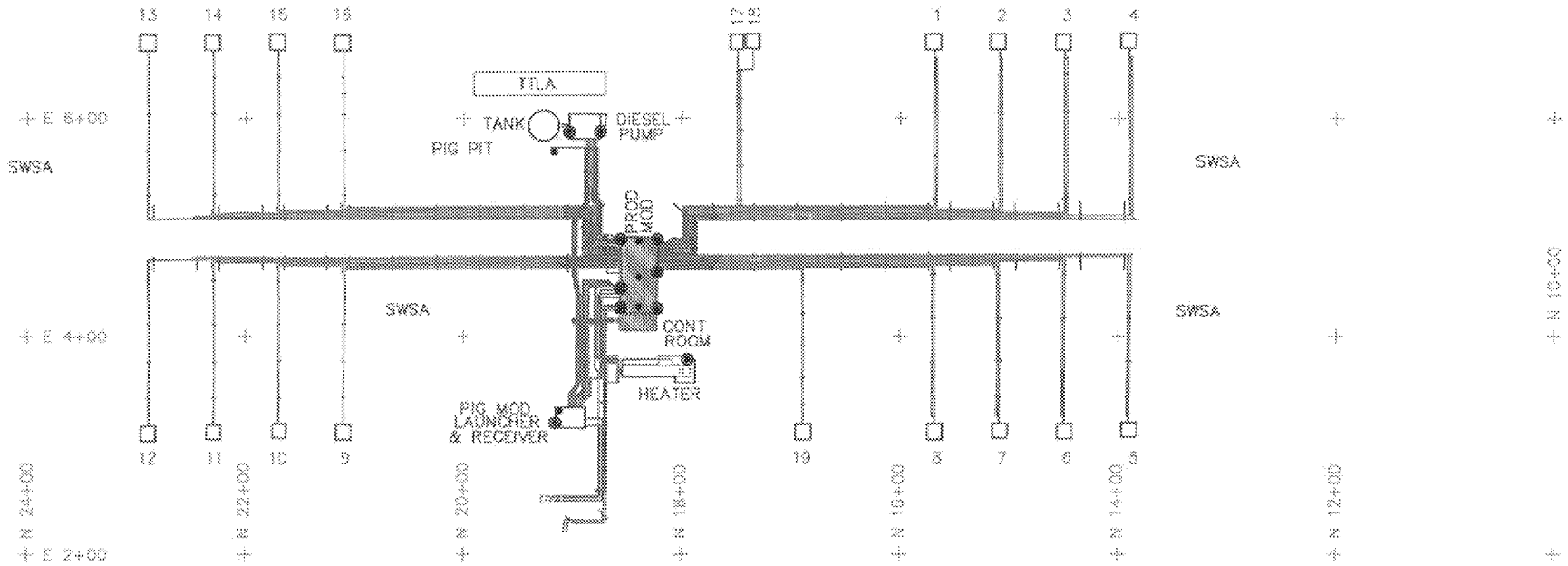
- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

DRILL SITE NORTH
N
ASP GRID
00°00'13"

DRILL SITE 2X



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K17002SACS	JLS	JAH		
1	12/14/16	Create DWG per K16002SACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: -- | CHECKED: JAH | APPROVAL: -- | CC NO: -- | SCALE: 1" = 100' | DATE: 12/08/16 | CADD FILENAME: LK6224d39 --

ConocoPhillips Alaska, Inc.

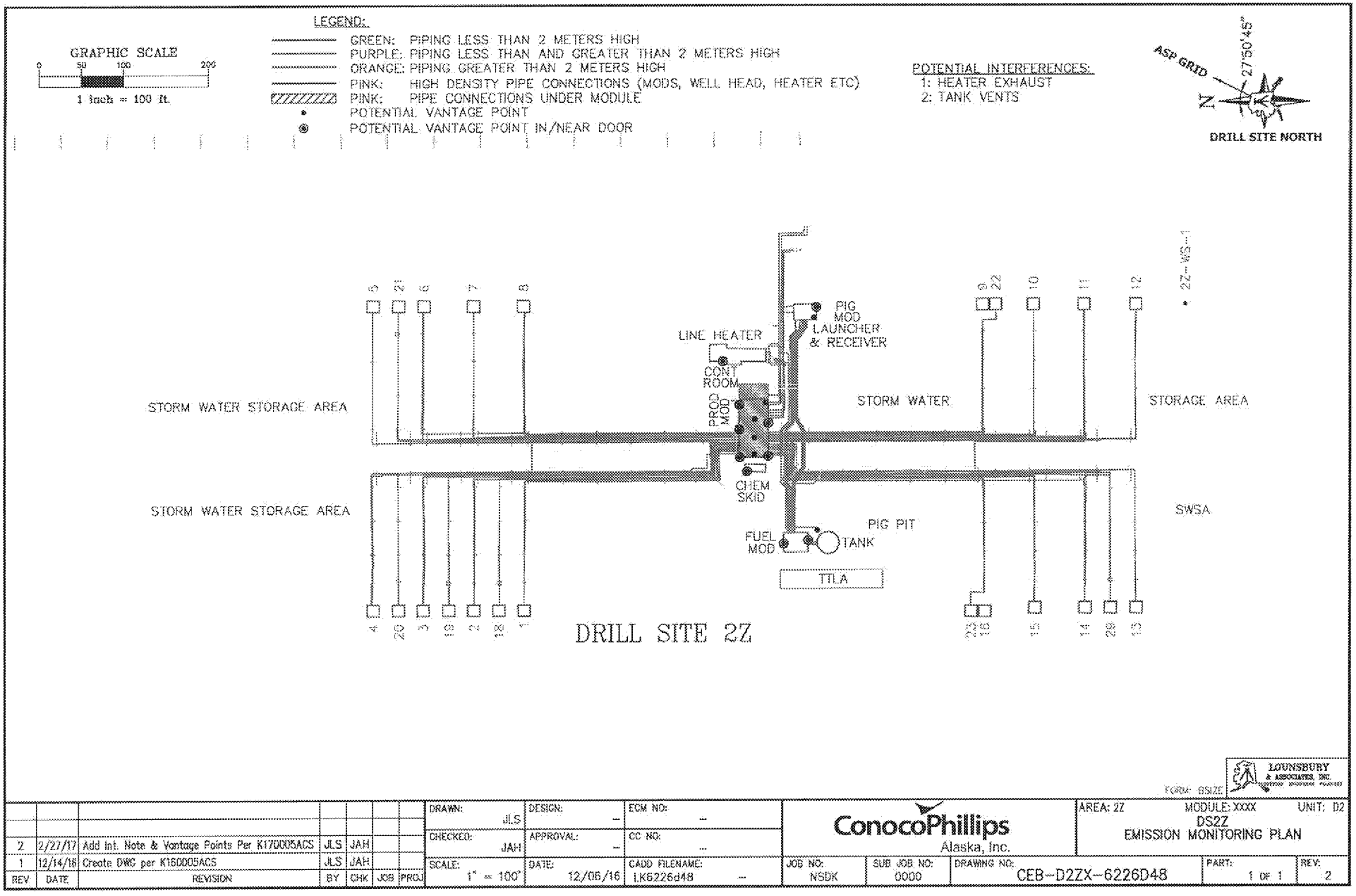
AREA: 2X | MODULE: XXXX | UNIT: D2

D52X
EMISSION MONITORING PLAN

JOB NO: N5DK | SUB JOB NO: 0000 | DRAWING NO: CEB-D2XX-6224D39 | PART: 1 OF 1 | REV: 2

LOUNSBURY & ASSOCIATES, INC.

FORM: B51LE



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 12/06/16 | CADD FILENAME: I_K6226d48 --

ConocoPhillips Alaska, Inc.

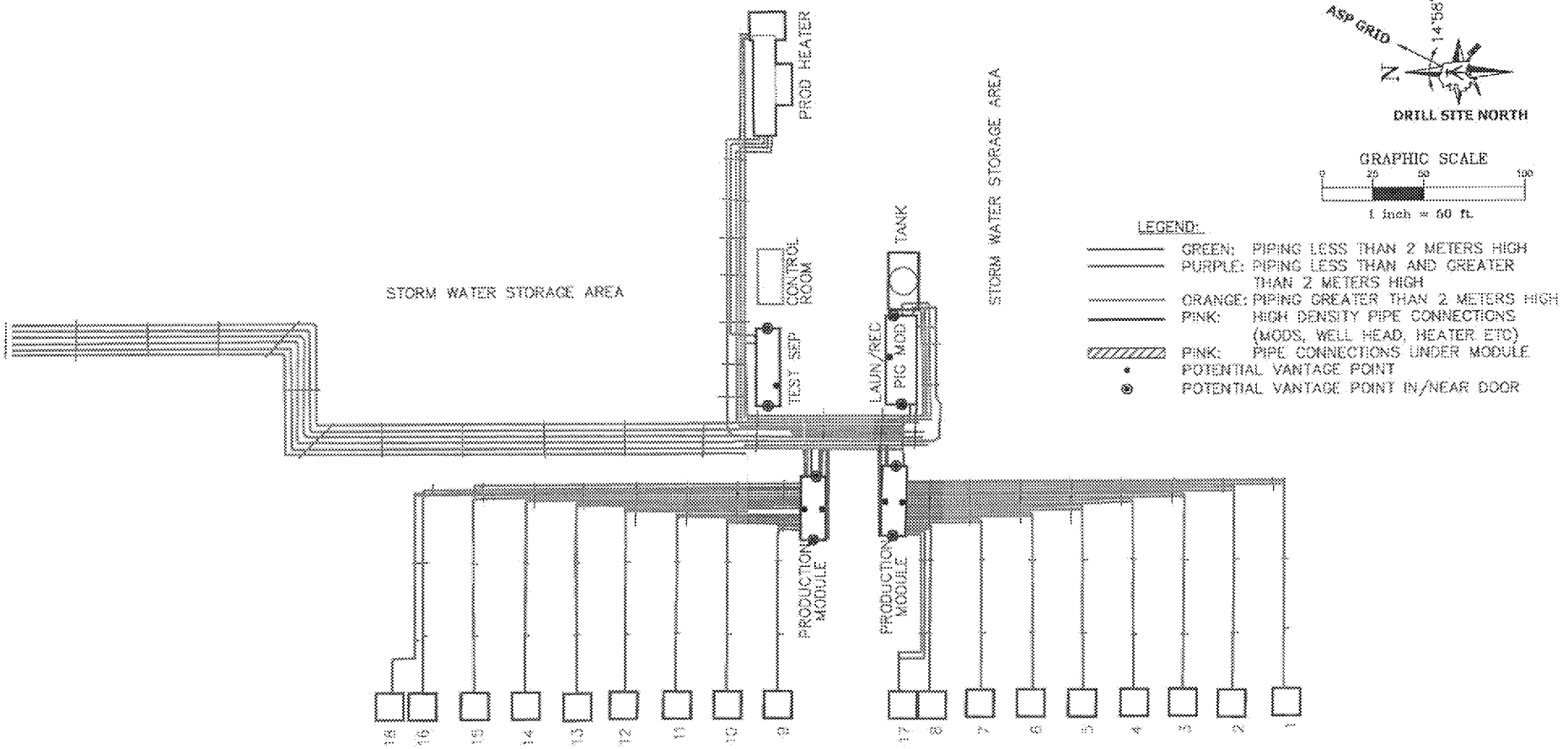
AREA: 2Z | MODULE: XXXX | UNIT: D2

DS2Z
EMISSION MONITORING PLAN

JOB NO: N5DK | SUB JOB NO: 0000 | DRAWING NO: CEB-D2ZX-6226D48 | PART: 1 OF 1 | REV: 2

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.



DRILL SITE 3A

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

LOUNSBURY & ASSOCIATES, INC.

FORM: B SIZE

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6301d33 –

ConocoPhillips Alaska, Inc.

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3AX-6301D33 | PART: 1 of 1 | REV: 2

AREA: 3A | MODULE: XXXX | UNIT: D3

DS3A
EMISSION MONITORING PLAN

LEGEND:

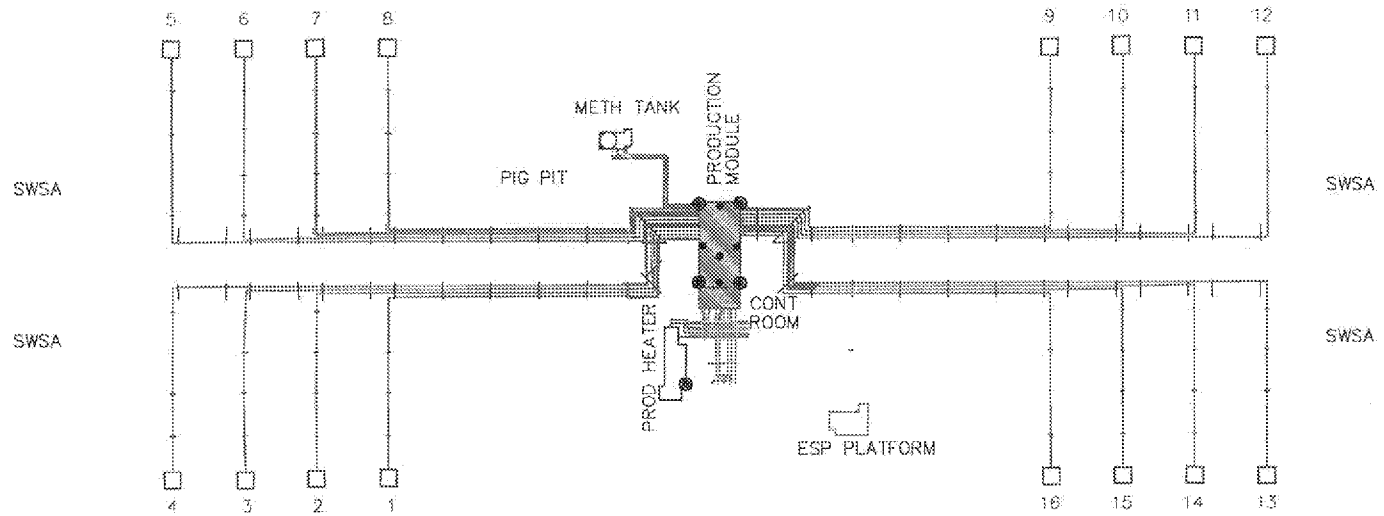
- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

ASP GRID 5°27'55" N
DRILL SITE NORTH

DRILL SITE 3B



FORM: BS2E

LOUNSBURY & ASSOCIATES, INC.

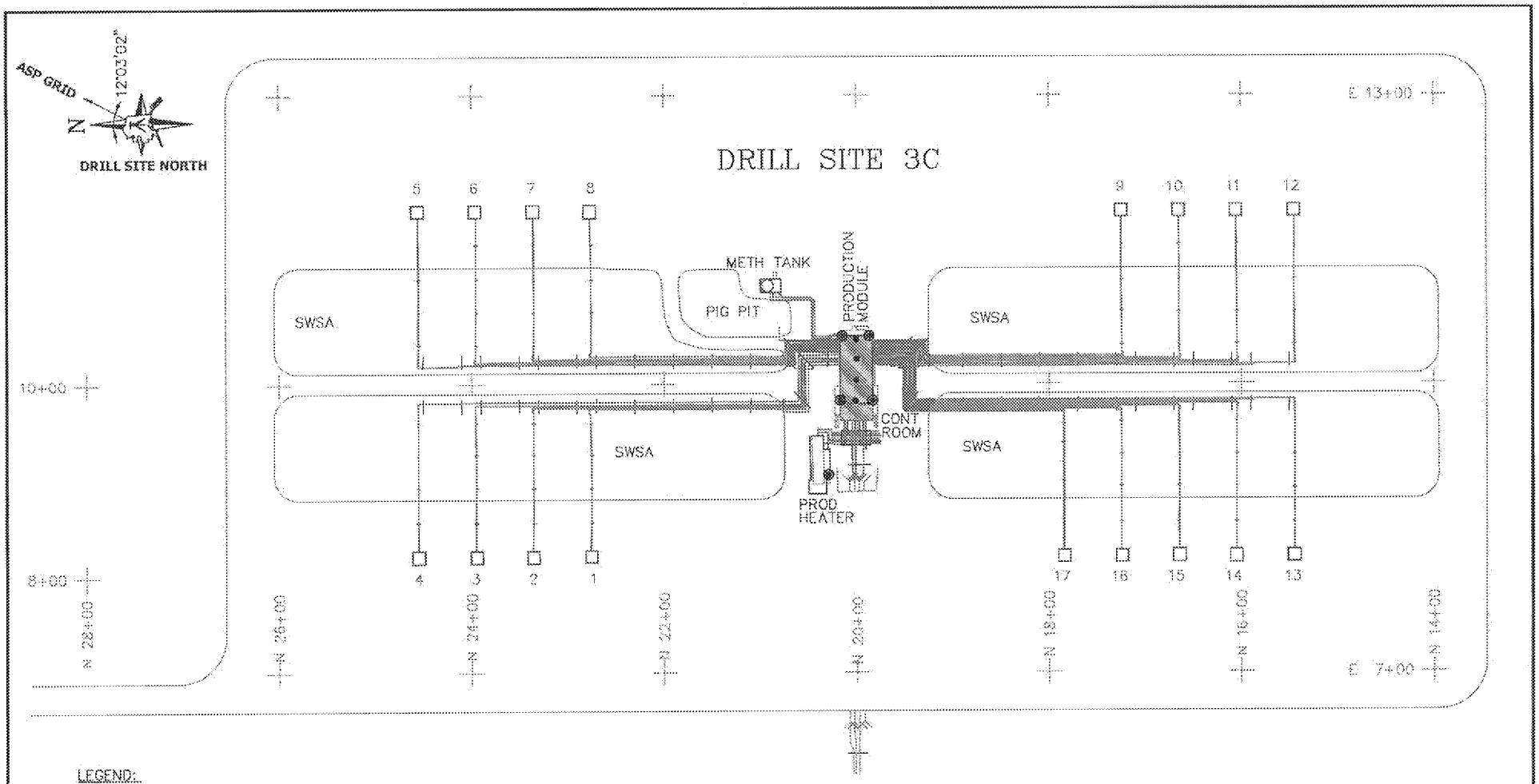
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | FCM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 100' | DATE: 12/12/16 | CADD FILENAME: LK6302d24 --

ConocoPhillips Alaska, Inc.

AREA: 3B | MODULE: XXXX | UNIT: 03
DS3B
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3BX-6302D24 | PART: 1 OF 1 | REV: 2



LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

GRAPHIC SCALE
0 50 100 200
1 inch = 100 ft.

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
3	1/27/19	Add Well 17 Piping per K190005ACS	JLS	JSC		
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
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ConocoPhillips Alaska, Inc.

AREA: 3C MODULE: XXXX UNIT: D3

DS3C
EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
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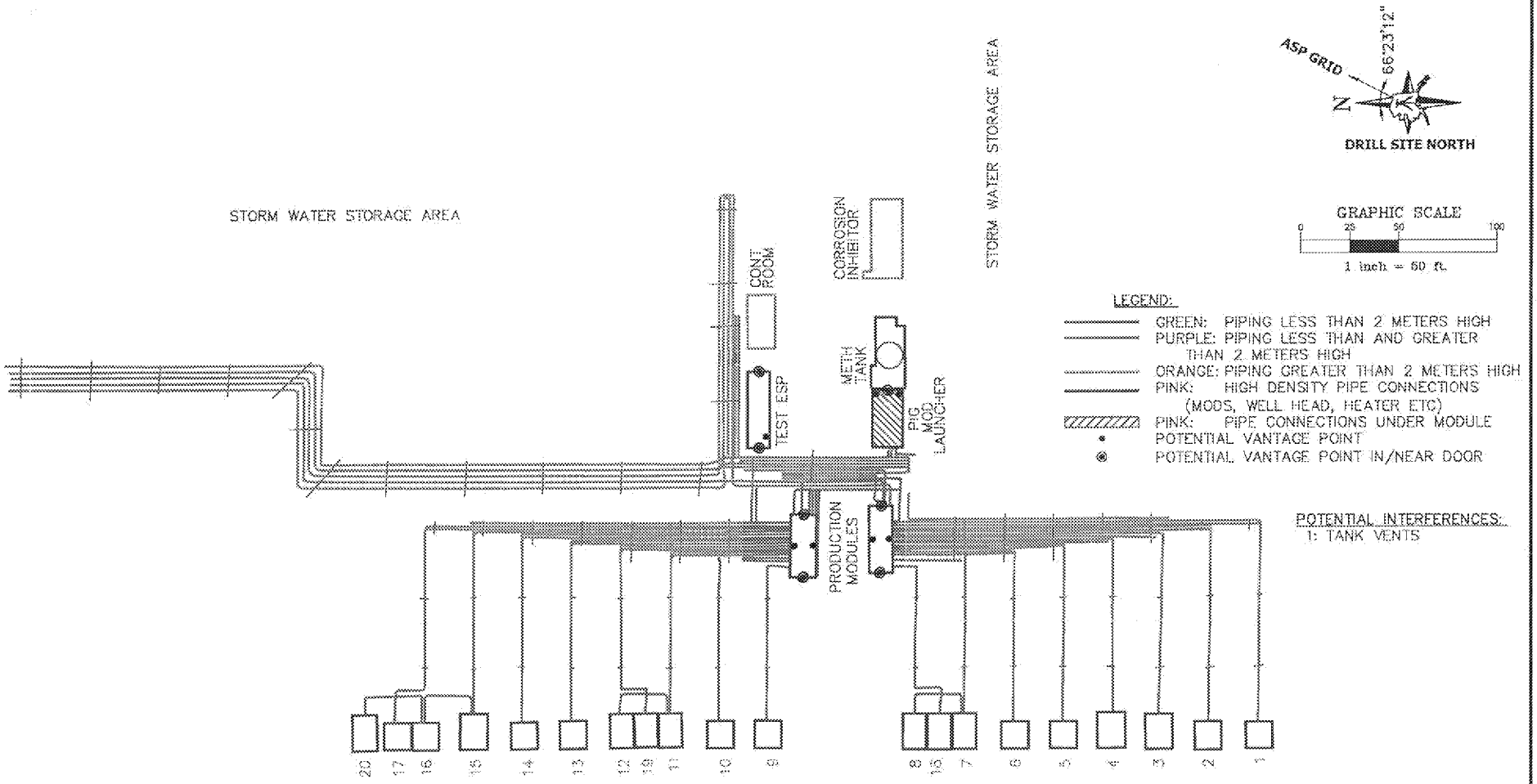


DRILL SITE 3F

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6306d36 –

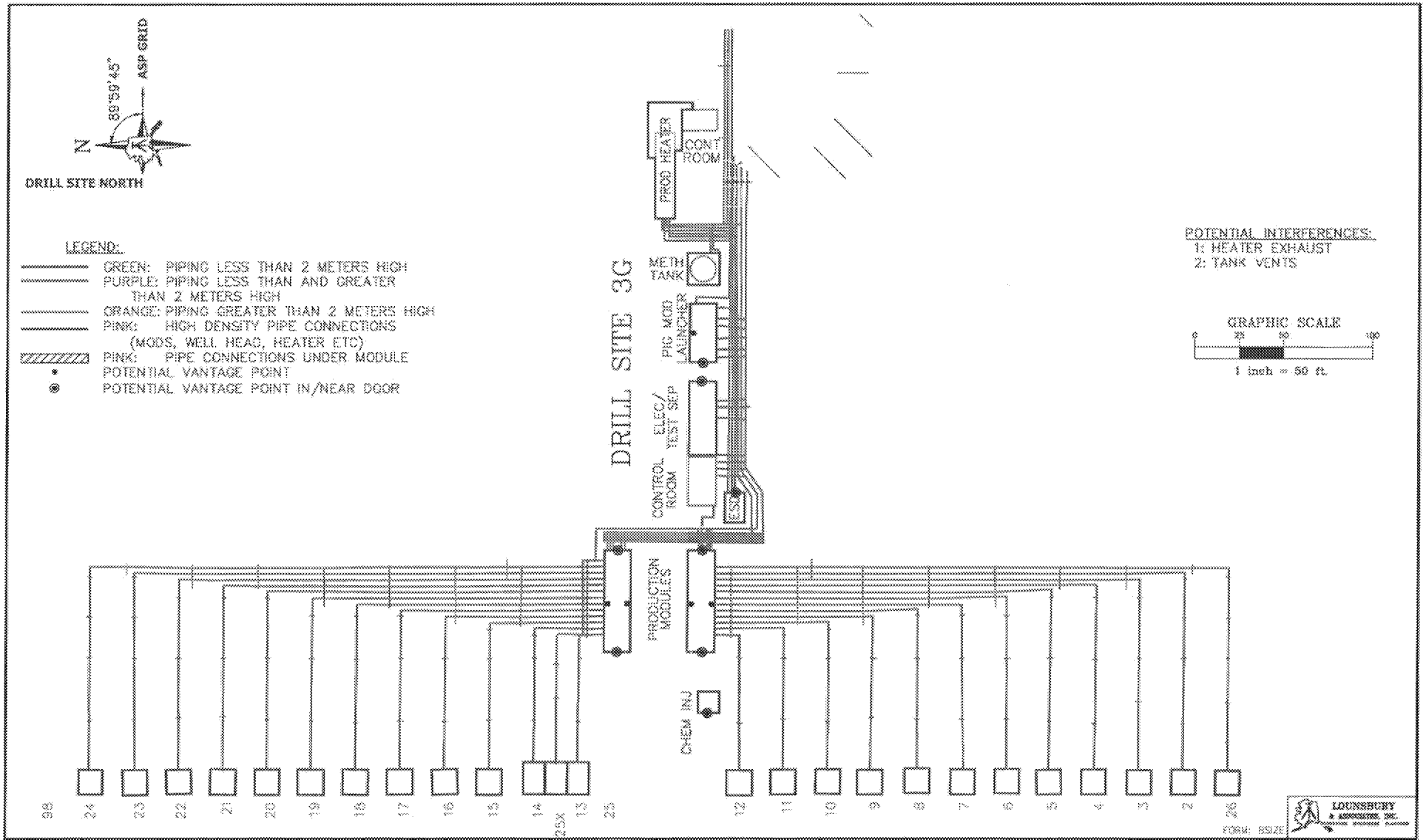
ConocoPhillips Alaska, Inc.

AREA: 3F | MODULE: XXXX | UNIT: D3
DS3F
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3FX-6306D36 | PART: 1 OF 1 | REV: 2

LOUNSBURY & ASSOCIATES, INC.

FORM: BSIZE



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6307d41 --

ConocoPhillips Alaska, Inc.

AREA: 3G | MODULE: XXXX | UNIT: D3

DS3G
EMISSION MONITORING PLAN

JOB NO: N5DK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3GX-6307D41 | PART: 1 OF 1 | REV: 2

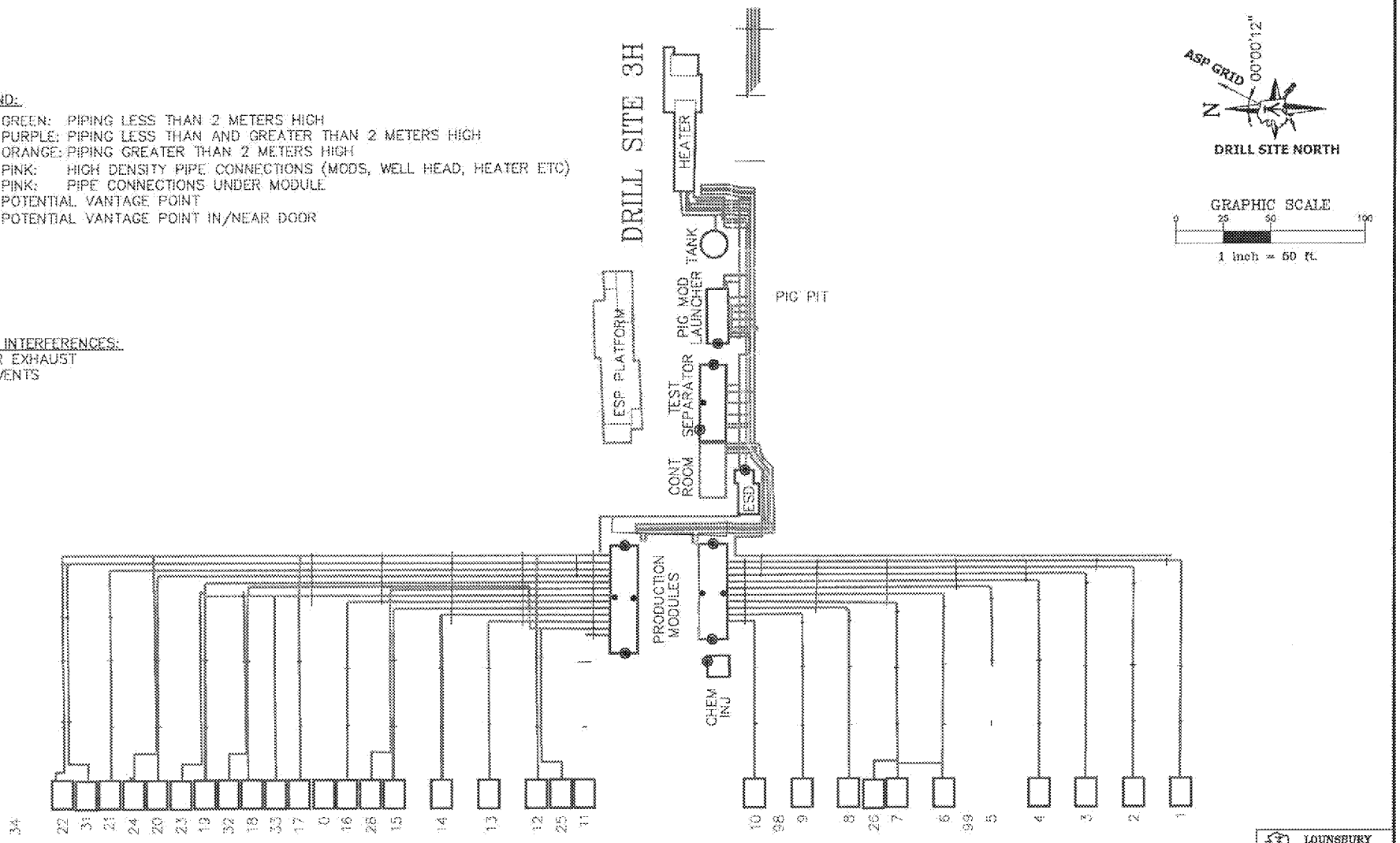
FORM: 55J2R

LOUNSBURY & ASSOCIATES, INC.

LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS



FORM: BASE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

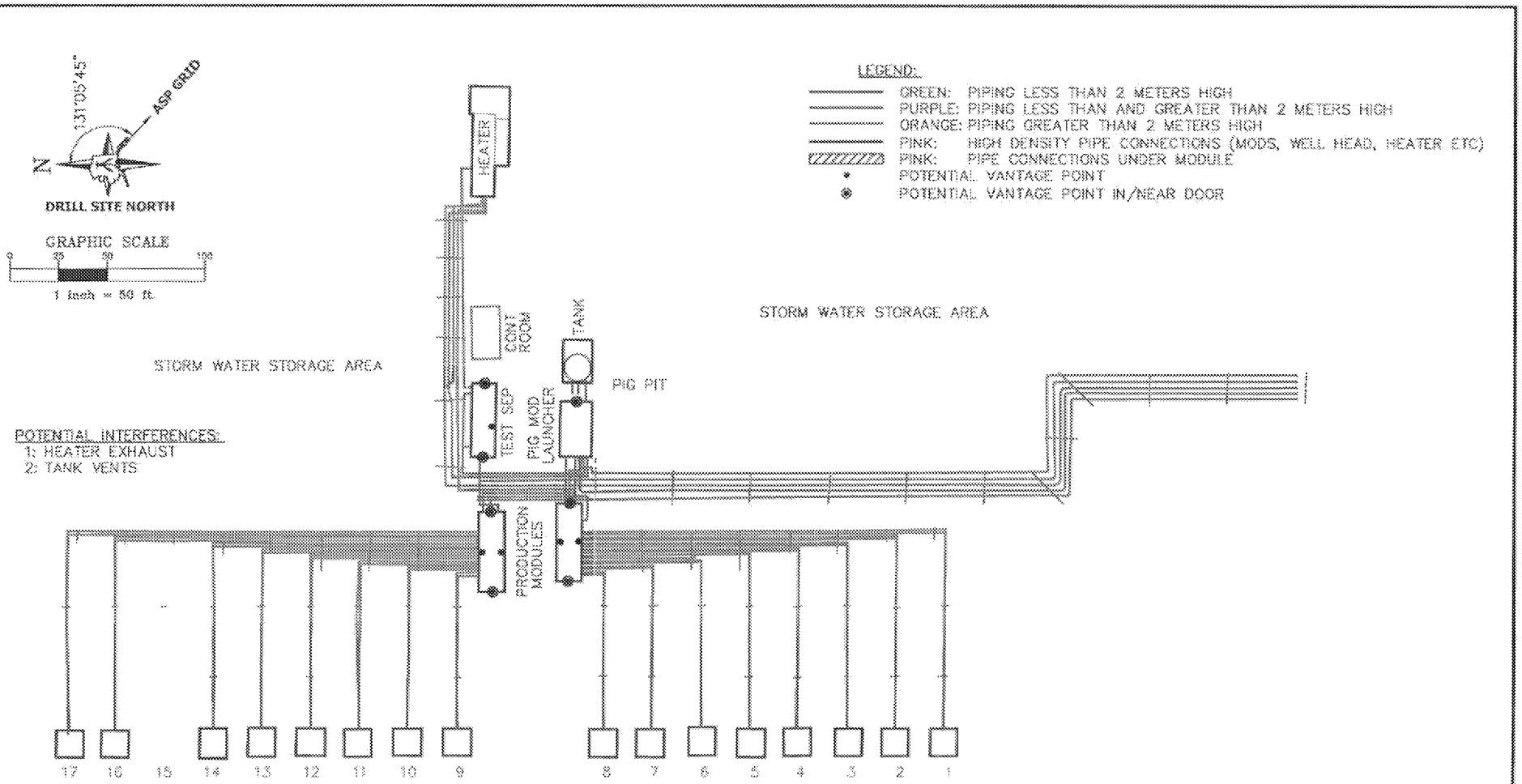
DRAWN: JLS | DESIGN: - | ECM NO: -
CHECKED: JAH | APPROVAL: - | CC NO: -
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6308d55 -

ConocoPhillips Alaska, Inc.

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3HX-6308D55 | PART: 1 OF 1 | REV: 2

AREA: 3H | MODULE: XXXX | UNIT: D3

DS3H
EMISSION MONITORING PLAN



DRILL SITE 3I

REV	DATE	REVISION	BY	CHK	JOB	PROJ.
2	2/27/17	Add Int. Note & Vantage Points Per K1700085ACS	JLS	JAH		
1	12/14/16	Create DWG per K1600085ACS	JLS	JAH		

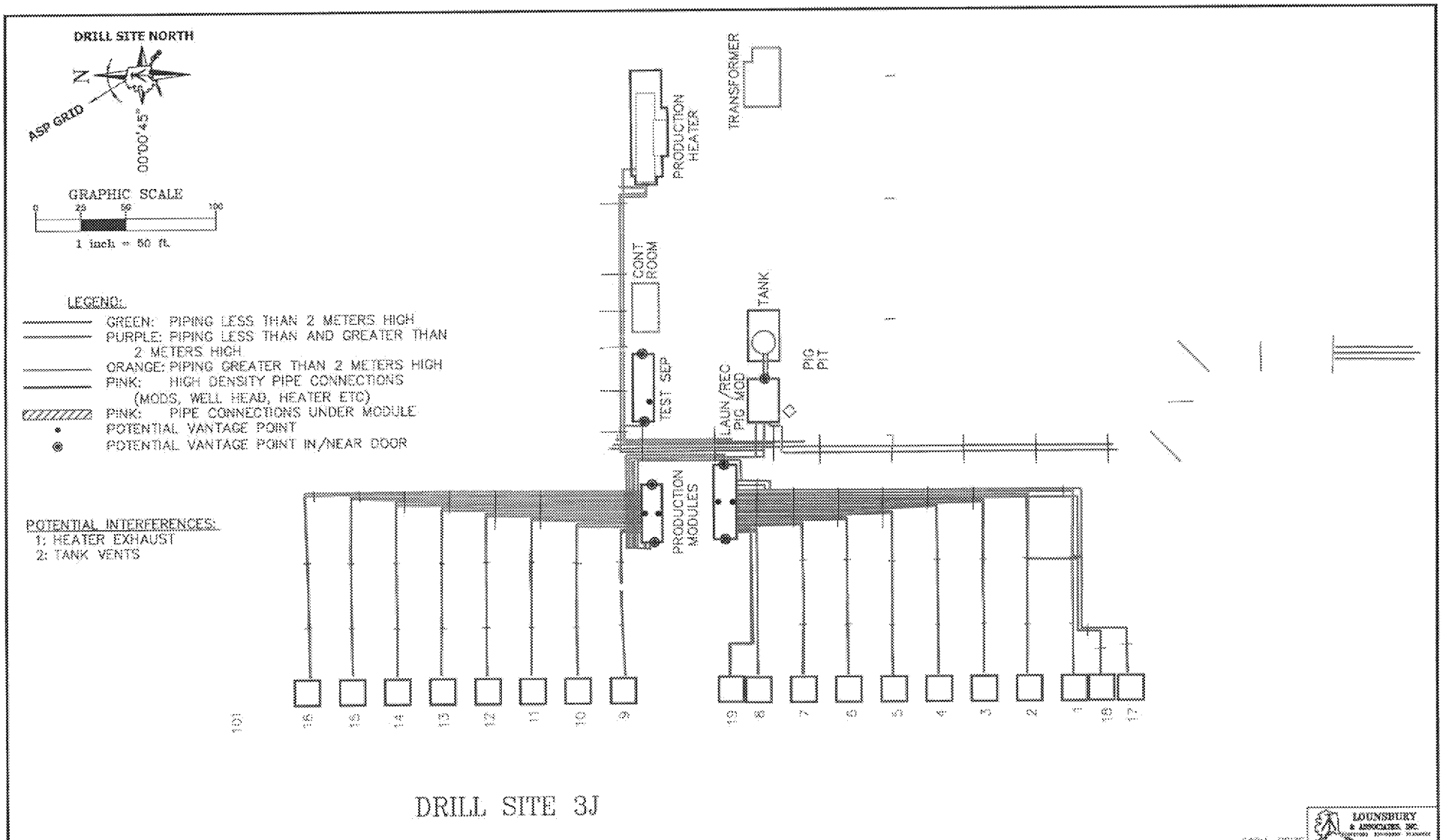
DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LX6309d26 –

ConocoPhillips Alaska, Inc.

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3IX-6309D26 | PART: 1 of 1 | REV: 2

AREA: 3I MODULE: XXXX UNIT: 03
D3.3I
EMISSION MONITORING PLAN

FORM: 8SIZE



DRILL SITE 3J

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

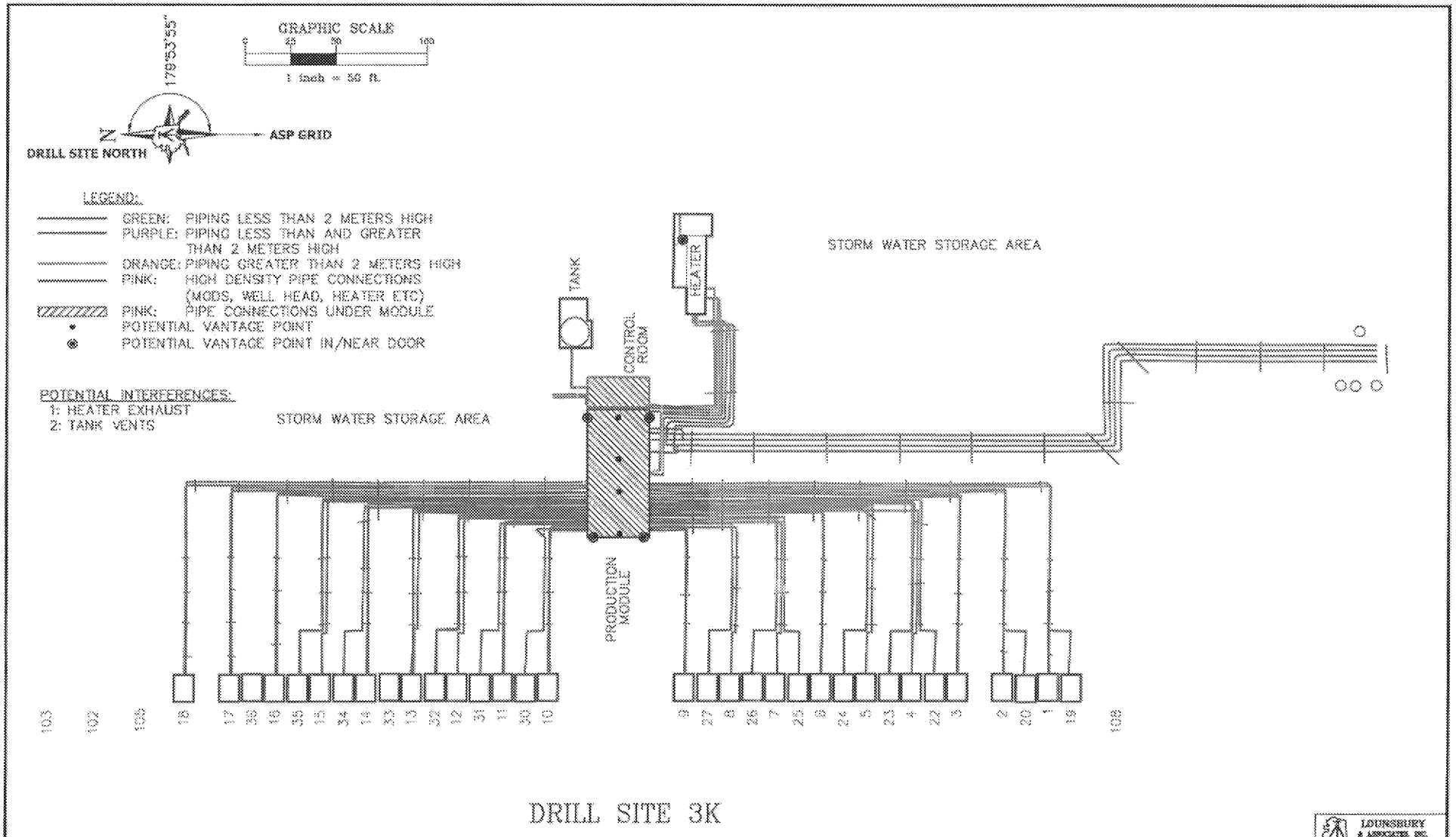
DRAWN: JLS	DESIGN: –	ECM NO: –	
CHECKED: JAH	APPROVAL: –	CC NO: –	
SCALE: 1" = 50'	DATE: 12/12/16	CADD FILENAME: LK6310d27	–

ConocoPhillips Alaska, Inc.

AREA: 3J MODULE: XXXX UNIT: 03

DS3J EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
N5DK	0000	CEB-D3JX-6310D27	1 OF 1	2



DRILL SITE 3K

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/15	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 50'	DATE: 12/12/15	CADD FILENAME: LK6311d42	--

ConocoPhillips Alaska, Inc.

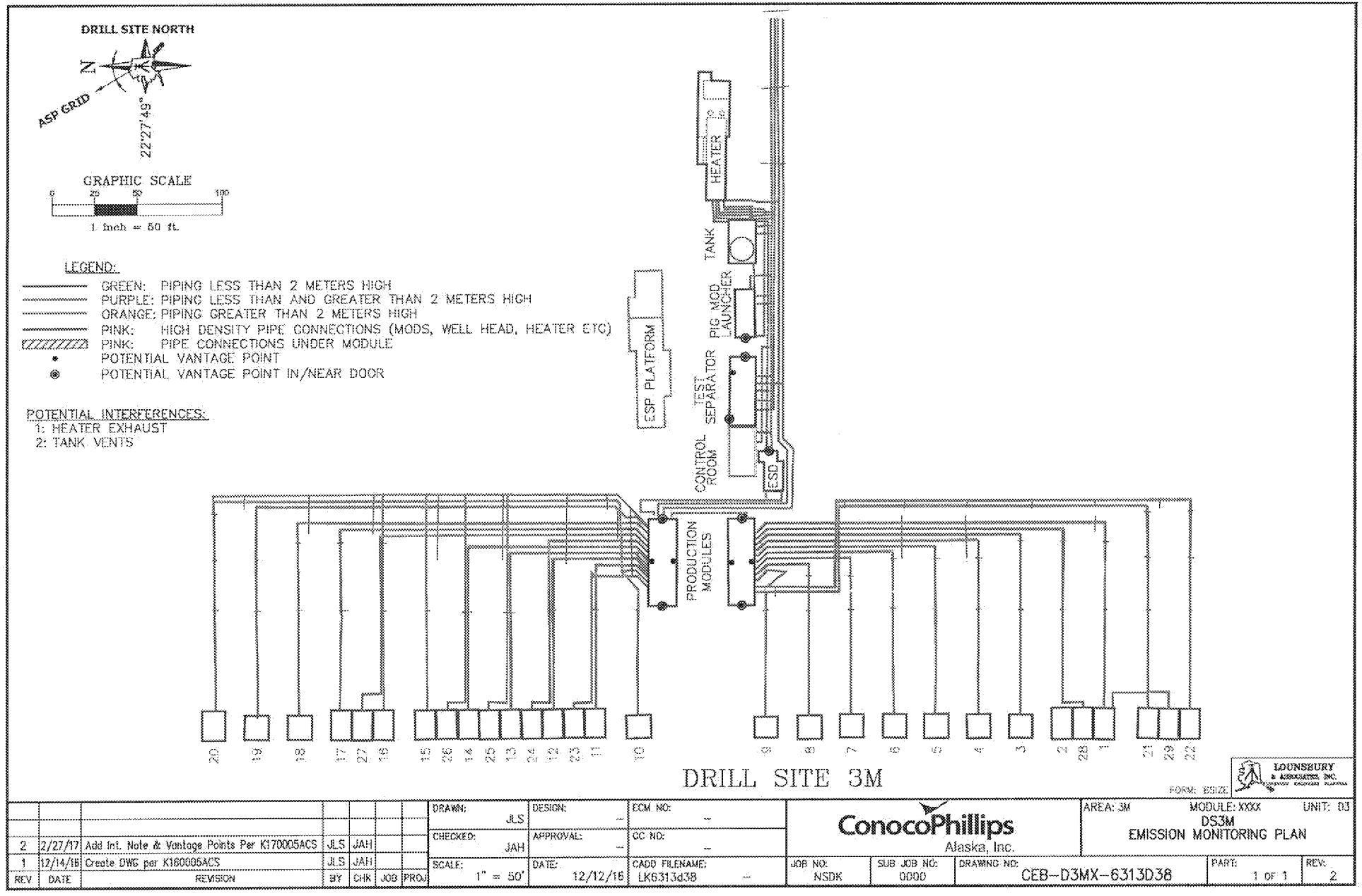
JOB NO: N5DK	SUB JOB NO: 0000	DRAWING NO: CEB-D3KX-6311D42	PART: 1 of 1

AREA: 3K MODULE: XXXX UNIT: D3
D3K
EMISSION MONITORING PLAN

REV: 2

FORM: 8512E

LOUNSBURY & ASSOCIATES, INC.



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: - | ECM NO: -
CHECKED: JAH | APPROVAL: - | CC NO: -
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6313d38

ConocoPhillips Alaska, Inc.

AREA: 3M | MODULE: XXXX | UNIT: 03
DS3M
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3MX-6313D38 | PART: 1 OF 1 | REV: 2

FORM: ESIZE

LOUNSBURY & ASSOCIATES, INC.

LEGEND:

GREEN: PIPING LESS THAN 2 METERS HIGH
PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
ORANGE: PIPING GREATER THAN 2 METERS HIGH
PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
PINK: PIPE CONNECTIONS UNDER MODULE
POTENTIAL VANTAGE POINT
POTENTIAL VANTAGE POINT IN/NEAR DOOR

GRAPHIC SCALE

0 25 50 100

1 inch = 50 ft.

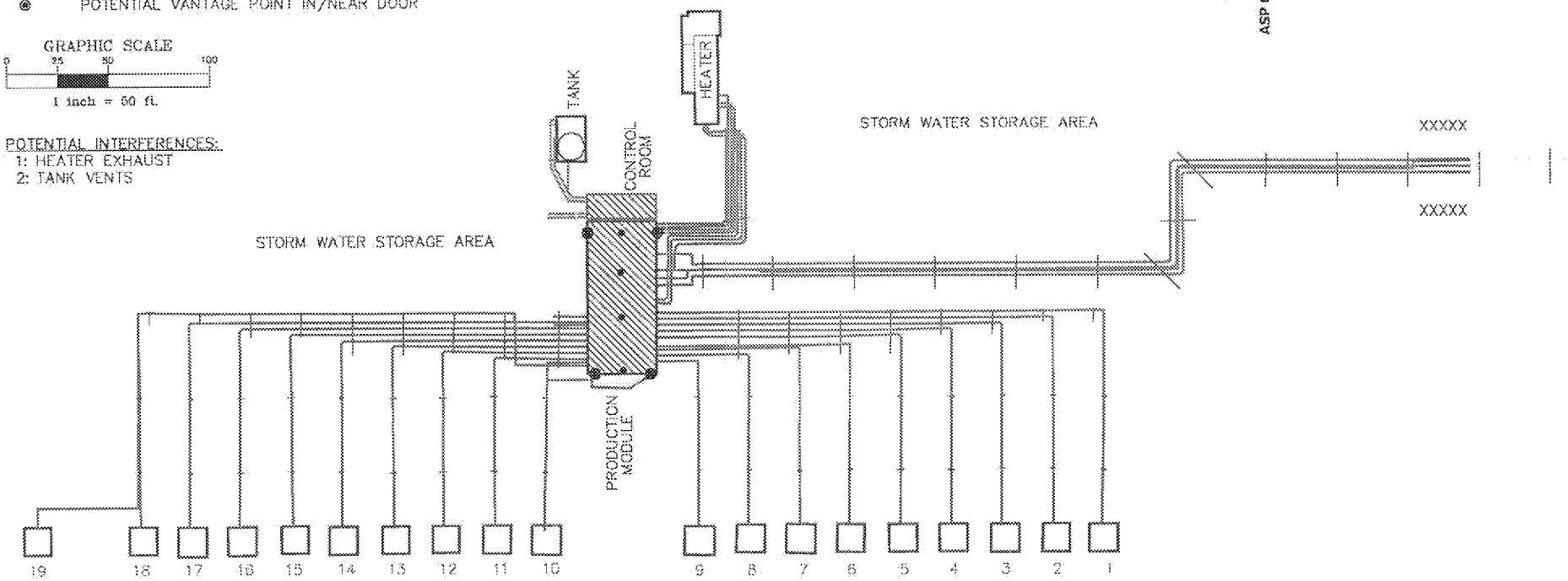
POTENTIAL INTERFERENCES:
1: HEATER EXHAUST
2: TANK VENTS

DRILL SITE NORTH

N

90°03'14"

ASP GRID



DRILL SITE 3N

FORM: 8SIZE

LOUNSBURY & ASSOCIATES, INC.

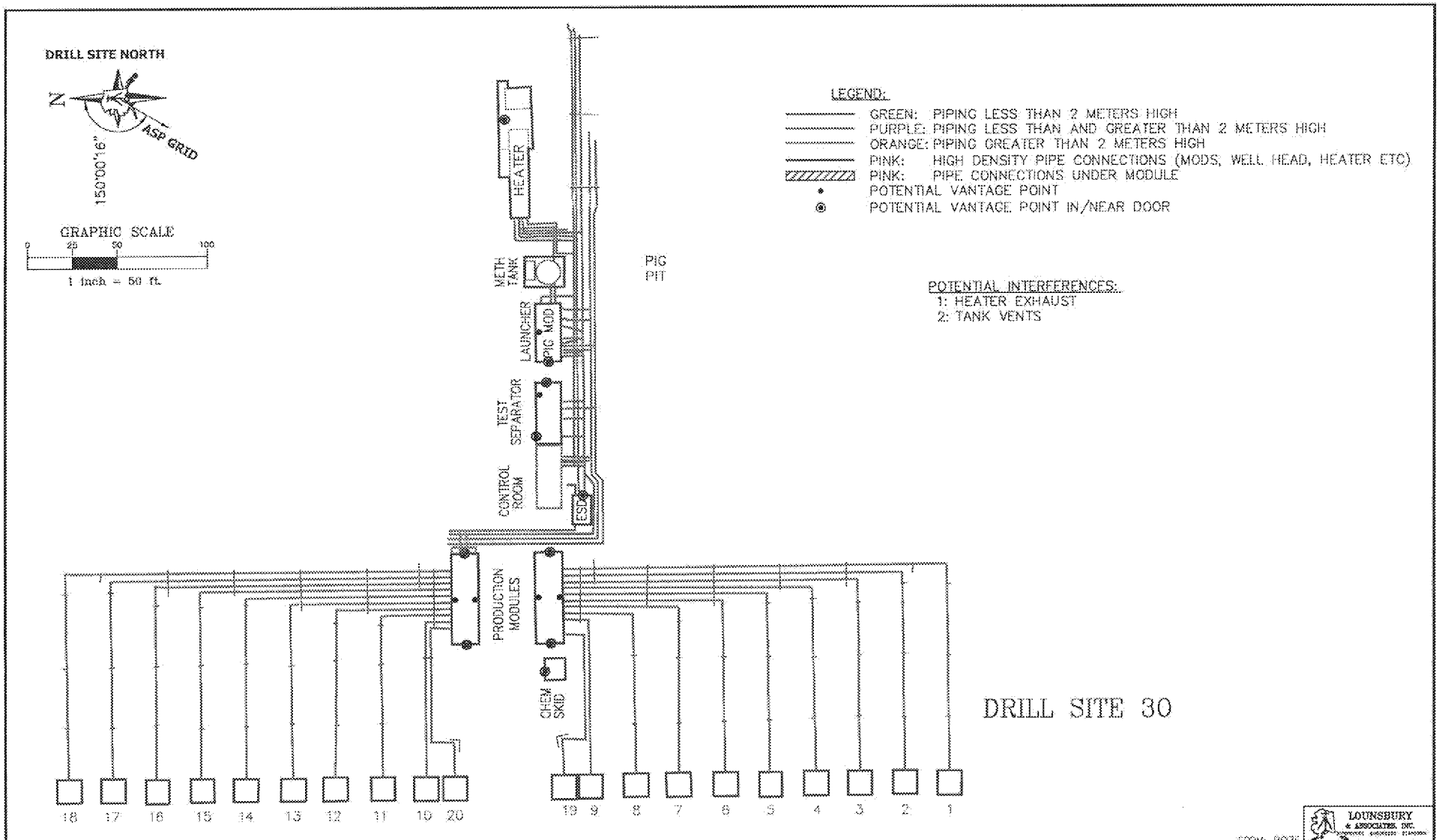
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170085ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | ECM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6314d23

ConocoPhillips Alaska, Inc.

AREA: 3N | MODULE: XXXX | UNIT: 03
DS3N
EMISSION MONITORING PLAN

JOB NO: N5DK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3NX-6314D23 | PART: 1 OF 1 | REV: 2



REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K160005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: –	ECM NO: –	
CHECKED: JAH	APPROVAL: –	CC NO: –	
SCALE: 1" = 50'	DATE: 12/12/16	CADD FILENAME: LK6315d36 –	

ConocoPhillips Alaska, Inc.

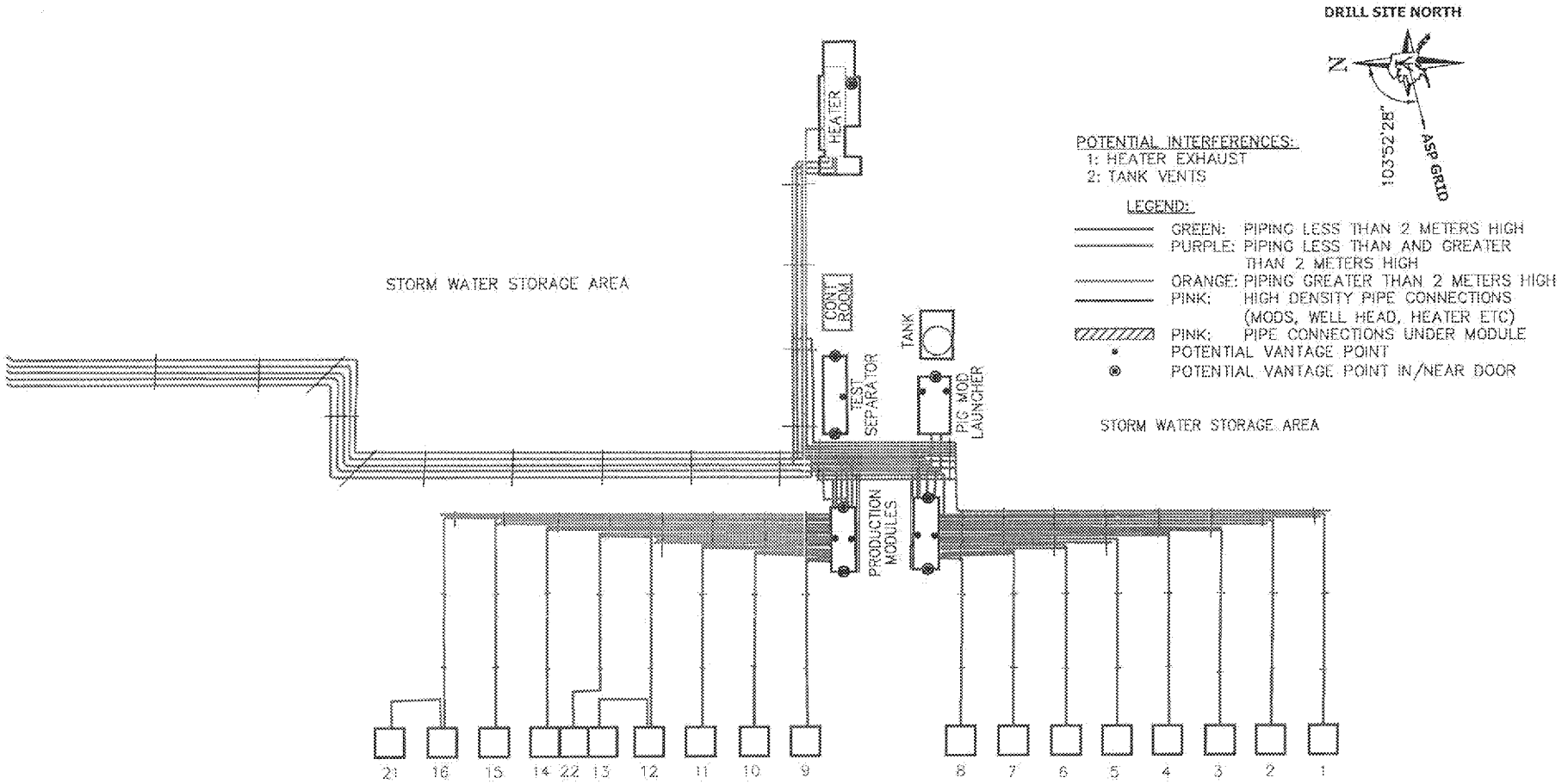
AREA: 30 MODULE: XXXX UNIT: 03

DS30
EMISSION MONITORING PLAN

JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
NSDK	0000	CEB-D30X-6315D36	1 OF 1	2

FORM: 8572

LOUNSBURY & ASSOCIATES, INC.



DRILL SITE 3Q

GRAPHIC SCALE
0 25 50 100
1 inch = 50 ft.

LOUNSBURY & ASSOCIATES, INC.

FORM: B22E

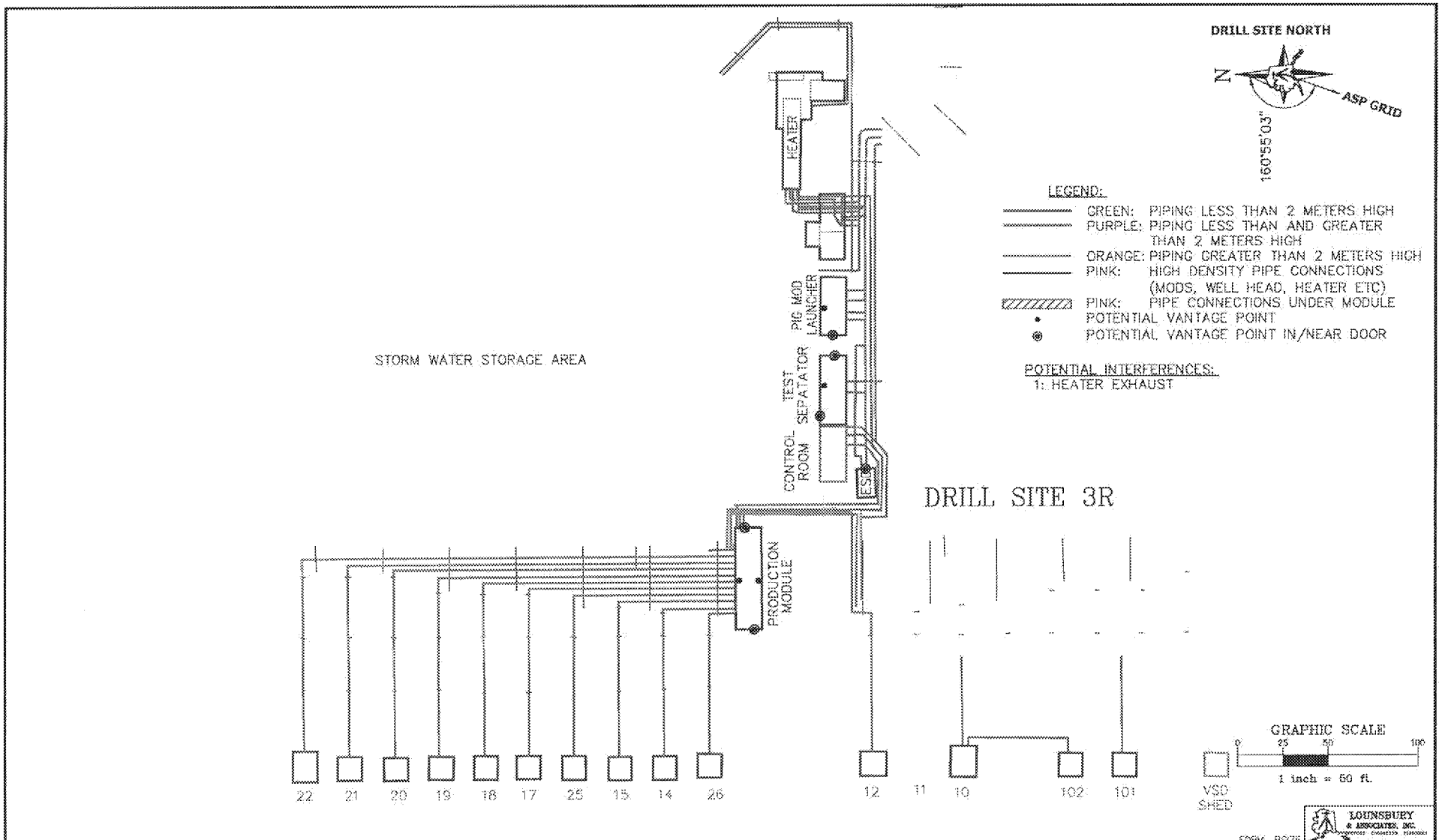
REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K170005ACS	JLS	JAH		
1	12/14/16	Create DWG per K16D005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: – | EGM NO: –
CHECKED: JAH | APPROVAL: – | CC NO: –
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6317d25 –

ConocoPhillips Alaska, Inc.

AREA: 3Q MODULE: XXXX UNIT: 03
DS3Q
EMISSION MONITORING PLAN

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3QX-6317D25 | PART: 1 of 1 | REV: 2



REV	DATE	REVISION	BY	CHK	JOB	PROJ
3	12/26/17	Add Wells 101 & 102 Per K1B0005ACS	JLS	JAH		
2	2/27/17	Add Int. Note & Vantage Points Per K1700005ACS	JLS	JAH		
1	12/14/16	Create DWG per K1B0005ACS	JLS	JAH		

DRAWN: JLS	DESIGN: --	ECM NO: --	
CHECKED: JAH	APPROVAL: --	CC NO: --	
SCALE: 1" = 50'	DATE: 12/12/16	CADD FILENAME: LK6318d23	--

ConocoPhillips Alaska, Inc.

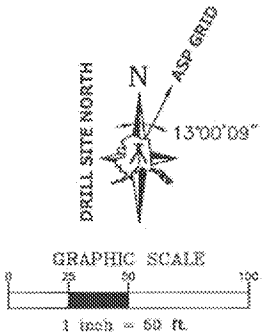
AREA: 3R MODULE: XXXX UNIT: D3

DS3R
EMISSION MONITORING PLAN

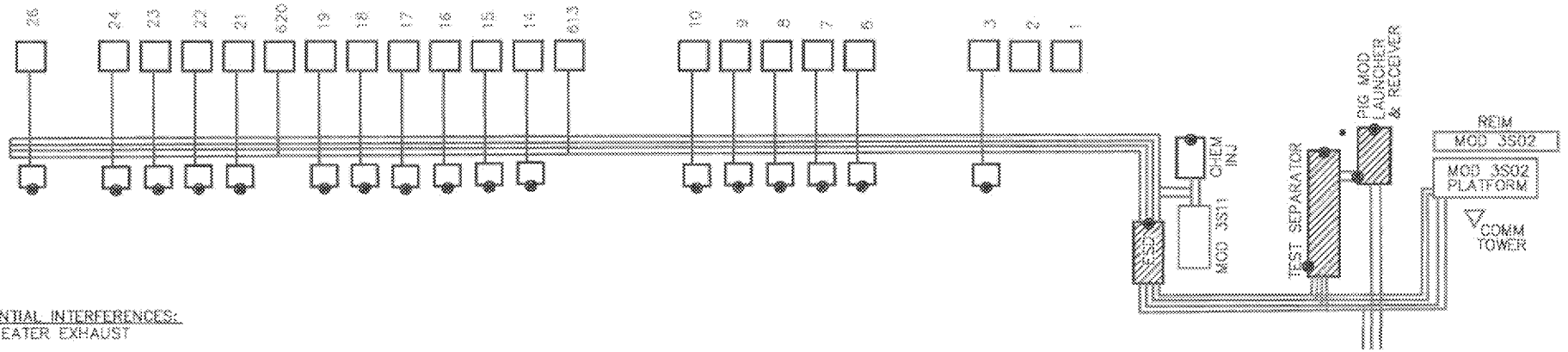
JOB NO:	SUB JOB NO:	DRAWING NO:	PART:	REV:
NSDK	0000	CEB-D3RX-6318D23	1 OF 1	3

FORM: B2SZE

LOUNSBURY & ASSOCIATES, INC.



DRILL SITE 3S



POTENTIAL INTERFERENCES:
1: HEATER EXHAUST

LEGEND:

- GREEN: PIPING LESS THAN 2 METERS HIGH
- PURPLE: PIPING LESS THAN AND GREATER THAN 2 METERS HIGH
- ORANGE: PIPING GREATER THAN 2 METERS HIGH
- PINK: HIGH DENSITY PIPE CONNECTIONS (MODS, WELL HEAD, HEATER ETC)
- PINK: PIPE CONNECTIONS UNDER MODULE
- POTENTIAL VANTAGE POINT
- POTENTIAL VANTAGE POINT IN/NEAR DOOR

REV	DATE	REVISION	BY	CHK	JOB	PROJ
2	2/27/17	Add Int. Note & Vantage Points Per K1700005ACS	JLS	JAH		
1	12/14/16	Create DWG per K1600005ACS	JLS	JAH		

DRAWN: JLS | DESIGN: -- | ECM NO: --
CHECKED: JAH | APPROVAL: -- | CC NO: --
SCALE: 1" = 50' | DATE: 12/12/16 | CADD FILENAME: LK6319d65 --

ConocoPhillips Alaska, Inc.

JOB NO: NSDK | SUB JOB NO: 0000 | DRAWING NO: CEB-D3SX-6319D65 | PART: 1 of 1 | REV: 2

AREA: 3S | MODULE: XXXX | UNIT: D3
D3S
EMISSION MONITORING PLAN

FORM: 8572

Appendix C FLIR Manufacturer Specifications

EPA OOOOa CERTIFIED

INDEPENDENT TESTING DEEMS FLIR CAMERAS COMPLIANT

FLIR is proud to announce its GFx320, GF320, GF300, and G300a cameras have been independently tested and deemed compliant with the EPA's NSPS 40 CFR part 60, subpart OOOOa sensitivity standard for optical gas imaging equipment.

Testing was performed by the National Physical Laboratory (NPL), which confirmed the FLIR GFx320, GF320, GF300, and G300a optical gas imaging cameras are capable of imaging a gas that is half methane/half propane at a concentration of 10,000 ppm at a flow rate of ≤60g/hr from a quarter inch diameter orifice.

Note: GFx320, GF320, GF300, and G300a cameras have identical detectors, hydrocarbon filters, optical platforms, and HSM algorithms.

CALIBRATION REQUIREMENTS

Gas Detection: No Calibration Required

The GFx320, GF320, GF300, and G300a camera's ability to detect gases is not influenced by any calibration process and will not degrade over time.

GAS COMPOUND DETECTION

The GFx320, GF320, GF300, and G300a optical gas imaging cameras are capable of imaging a wide array of gas compounds but were specifically designed to see the following hydrocarbons:

Methane	Isoprene
Benzene	MEK
Propane	Methanol
Butane	MIBK
Ethane	Octane
Ethanol	Pentane
Ethylbenzene	Propylene
Ethylene	Toluene
Heptane	Xylene
Hexane	1-Pentene

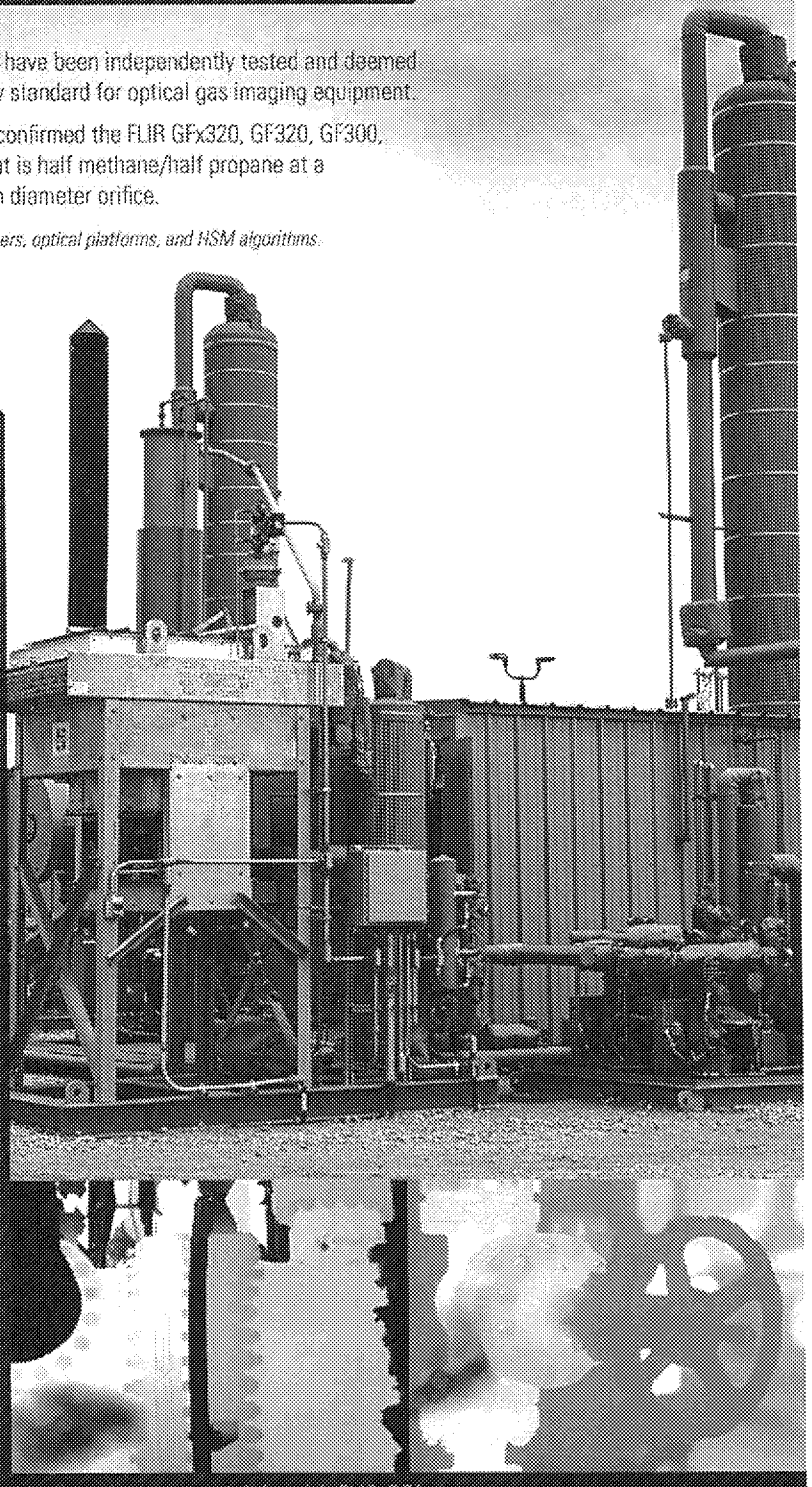
QUESTIONS AND MANUALS

To download the latest GF Manual or address questions to the FLIR Gas Detection team, please go to our FLIR Customer Support Portal: *http://flir.custhelp.com*

GAS DETECTION TRAINING

Learn about ITC training courses for gas detection and OOOOa program development – *www.infraredtraining.com*

Visit our blog for the latest updates in FLIR Gas Detection – *www.flir.com/FLIRNews*



Methane leaks now visible with FLIR GGI cameras

www.flir.com/ogi

FLIR | The World's Sixth Sense

Appendix D KRU and ALP Gas Analyses

Kuparuk Gas Composition:

FUEL COMPONENT	MOLE FRAC	COMP MOLES CARB	MOLES CARBON
methane	0.84716	1	0.84716
ethane	0.06708	2	0.13416
propane	0.03563	3	0.10689
i-butane	0.00954	4	0.03816
n-butane	0.01797	4	0.07188
i-pentane	0.00244	5	0.0122
n-pentane	0.00207	5	0.01035
hexane	0.00071	6	0.00426
co2	0.01375		
n2	0.00366		
			1.22506

Alpine Gas Composition:

FUEL COMPONENT	MOLE FRAC	COMP MOLES CARB	MOLES CARBON
methane	0.7101	1	0.7101
ethane	0.1104	2	0.2208
propane	0.1165	3	0.3495
i-butane	0.0152	4	0.0608
n-butane	0.029	4	0.116
i-pentane	0.003	5	0.015
n-pentane	0.0043	5	0.0215
hexane	0.0004	6	0.0024
co2	0.0056		
n2	0.0055		
	1		1.4961

PBU Gas Composition:

Parameter	Result	UOM
AVERAGE MOLECULAR WT	20.70	g/mol
BTU/IDEAL CF (DRY)	962.2	Btu/SCF
BTU/IDEAL CF (SAT)	947.6	Btu/SCF
BTU/REAL CF (DRY)	961.7	Btu/SCF
BTU/REAL CF (SAT)	944.9	Btu/SCF
C6 HEAVIER	0.024	Mole %
C8 HEAVIER	0.005	Mole %
CARBON DIOXIDE	11.459	Mole %
COMPRESSIBILITY	0.9974	(blank)
DEW POINT	0.2	Deg F
ETHANE	5.298	Mole %
HYDROGEN SULFIDE	40	ppm
I-BUTANE	0.102	Mole %
I-PENTANE	0.021	Mole %
METHANE	80.576	Mole %
N2 (NITROGEN)	0.627	Mole %
N-BUTANE	0.175	Mole %
NET HEAT OF COMB	868.2	Btu/SCF
N-PENTANE	0.022	Mole %
PROPANE	1.697	Mole %
SPECIFIC GRAV IDEAL	0.7148	(blank)
SPECIFIC GRAV REAL	0.7164	(blank)
TOTAL C6S	0.011	Mole %
TOTAL C7S	0.008	Mole %

Appendix E PID Correlation Calculations

CPAI PID Correlation to FID Methane Equivalents - KRU Gas

Assumptions:

1. CPAI only utilizing MiniRae 3000 PID devices which are equipped with an 11.7 eV lamp.
2. An 11.7 eV lamp can be non-responsive to smaller chain hydrocarbons. PID CF is infinite for such components.
3. FID RF that are unknown are based on # of carbons in component (most conservative option).
4. Correlation based on a back calculation of equation for FID CH4 equivalents from PID reading

$$FID\ CH_4\ equiv. = 500\ ppmv = PID\ Reading \times \left[\frac{1}{\sum_{i=1}^{\infty}(x_i \div CF_i)}\right] \times \left[\sum_{j=1}^{\infty}(x_j \times RF_j)\right]$$

$$PID\ Reading = 500\ ppmv \times \sum_{i=1}^{\infty}(x_i \div CF_i) \times \left[\frac{1}{\sum_{j=1}^{\infty}(x_j \times RF_j)}\right]$$

KRU Gas

UID	Component	Mol Fraction	PID CF (11.7 eV)	FID RF	CFMix	RF Mix
1	Methane	0.84716	∞	1.0	0.0000000	0.8471600
2	Ethane	0.06708	15	2.0	0.0044720	0.1341600
3	Propane	0.03563	1.8	3.0	0.0197944	0.1068900
4	i-Butane	0.00954	1.2	4.0	0.0079500	0.0381600
5	n-Butane	0.01797	1.2	4.0	0.0149750	0.0718800
6	i-Pentane	0.00244	0.7*	5.0	0.0034857	0.0122000
7	n-Pentane	0.00207	0.7	5.0	0.0029571	0.0103500
8	Hexane	0.00071	0.54	4.7	0.0013148	0.0033370
9	Carbon Dioxide	0.01375	∞	1.0	0.0000000	0.0137500
10	Nitrogen	0.00366	∞	0.0	0.0000000	0.0000000
* Assumed equivalent to n-Pentane				Total	0.0549491	1.2378870

$$PID\ Reading = 500\ ppmv \times 0.0549491 \times \left(\frac{1}{1.2378870}\right) = 22.2\ ppmv$$

PID CF from: http://www.raesystems.com/sites/default/files/content/resources/Technical-Note-105_A-Guideline-for-Pid-Instrument-Response_0.pdf

CPAI PID Correlation to FID Methane Equivalents - ALP Gas

Assumptions:

1. CPAI only utilizing MiniRae 3000 PID devices which are equipped with an 11.7 eV lamp.
2. An 11.7 eV lamp can be non-responsive to smaller chain hydrocarbons. PID CF is infinite for such components.
3. FID RF that are unknown are based on # of carbons in component (most conservative option).
4. Correlation based on a back calculation of equation for FID CH4 equivalents from PID reading

$$FID\ CH_4\ equiv. = 500\ ppmv = PID\ Reading \times \left[\frac{1}{\sum_{i=1}^{\infty}(x_i \div CF_i)}\right] \times \left[\sum_{j=1}^{\infty}(x_j \times RF_j)\right]$$

$$PID\ Reading = 500\ ppmv \times \sum_{i=1}^{\infty}(x_i \div CF_i) \times \left[\frac{1}{\sum_{j=1}^{\infty}(x_j \times RF_j)}\right]$$

ALP Gas

UID	Component	Mol Fraction	PID CF (11.7 eV)	FID RF	CFMix	RF Mix
1	Methane	0.71010	∞	1.0	0.0000000	0.7101000
2	Ethane	0.11040	15	2.0	0.0073600	0.2208000
3	Propane	0.11650	1.8	3.0	0.0647222	0.3495000
4	i-Butane	0.01520	1.2	4.0	0.0126667	0.0608000
5	n-Butane	0.02900	1.2	4.0	0.0241667	0.1160000
6	i-Pentane	0.00300	0.7*	5.0	0.0042857	0.0150000
7	n-Pentane	0.00430	0.7	5.0	0.0061429	0.0215000
8	Hexane	0.00040	0.54	4.7	0.0007407	0.0018800
9	Carbon Dioxide	0.00560	∞	1.0	0.0000000	0.0056000
10	Nitrogen	0.00550	∞	0.0	0.0000000	0.0000000
* Assumed equivalent to n-Pentane				Total	0.1200849	1.5011800

$$PID\ Reading = 500\ ppmv \times 0.1200849 \times \left(\frac{1}{1.5011800}\right) = 40.0\ ppmv$$

PID CF from: http://www.raesystems.com/sites/default/files/content/resources/Technical-Note-106_A-Guideline-for-Pid-Instrument-Response_0.pdf

CPAI PID Correlation to FID Methane Equivalents - PBU Gas

Assumptions:

1. CPAI only utilizing MiniRae 3000 PID devices which are equipped with an 11.7 eV lamp.
2. An 11.7 eV lamp can be non-responsive to smaller chain hydrocarbons. PID CF is infinite for such components.
3. FID RF that are unknown are based on # of carbons in component (most conservative option).
4. Correlation based on a back calculation of equation for FID CH4 equivalents from PID reading

$$FID\ CH_4\ equiv. = 500\ ppmv = PID\ Reading \times \left[\frac{1}{\sum_{i=1}^{\infty}(x_i \div CF_i)}\right] \times \left[\sum_{j=1}^{\infty}(x_j \times RF_j)\right] \qquad PID\ Reading = 500\ ppmv \times \sum_{i=1}^{\infty}(x_i \div CF_i) \times \left[\frac{1}{\sum_{j=1}^{\infty}(x_j \times RF_j)}\right]$$

PBU Gas

UID	Component	Mol Fraction	PID CF (11.7 eV)	FID RF	CFMix	RF Mix
1	Methane	0.80576	∞	1.0	0.0000000	0.8057600
2	Ethane	0.05298	15	2.0	0.0035320	0.1059600
3	Propane	0.01697	1.8	3.0	0.0094278	0.0509100
4	i-Butane	0.00102	1.2	4.0	0.0008500	0.0040800
5	n-Butane	0.00175	1.2	4.0	0.0014583	0.0070000
6	i-Pentane	0.00021	0.7*	5.0	0.0003000	0.0010500
7	n-Pentane	0.00022	0.7	5.0	0.0003143	0.0011000
8	Hexane	0.00024	0.54	4.7	0.0004444	0.0011280
9	Carbon Dioxide	0.11459	∞	1.0	0.0000000	0.1145900
10	Nitrogen	0.00627	∞	0.0	0.0000000	0.0000000
* Assumed equivalent to n-Pentane				Total	0.0163268	1.0915780

$$PID\ Reading = 500\ ppmv \times 0.0163268 \times \left(\frac{1}{1.0915780}\right) = 7.5\ ppmv$$

PID CF from: http://www.raesystems.com/sites/default/files/content/resources/Technical-Note-106_A-Guideline-for-Pid-Instrument-Response_0.pdf